CA-IR-408

Ref: HECO-615, page 3 (Power Supply Management Reporting).

With regard to the Manager, Operations & Maintenance position shown in the organization table, please provide the following:

a. Identify and describe each of the recurring monthly reports prepared by or for this management employee, for use in informing HECO senior management personnel about the operational or financial performance of the business unit(s) within the responsibility of this manager.

b. Provide copies of each of the reports identified in your response to part (a) for each available month of 2007, to date.

c. To the extent not provided in your response to part (b) of this information request, please provide detailed copies of all financial analyses and budget variance reports prepared by or for the use of the Manager, Operations & Maintenance for all available periods in 2007, to-date.

HECO Response:

a. The title and description of the recurring monthly operational and financial reports prepared by or for the Manager, Operations & Maintenance are presented in Attachment 1 to this response.

b. The Company objects to providing the requested internally distributed management reports, including variance reports, as these documents are privileged and confidential and should not be provided on public policy grounds, as described below, and it would be unduly burdensome to produce all such reports, which are generated on a frequent basis, and which would require explanations of how unadjusted budget numbers relate to test year numbers to be meaningful, which also would be unduly burdensome.

Without waiving its objections, HECO provides the reports identified below.

The first column of Attachment 1 of this response provides the attachment number of

each report. Attachments 2A through 2E of the response to CA-IR-408 provide the Forward Looking Financial Update for January through May 2007.

Attachments 3 through 6 provide the reports as indicated in Attachment 1 only for the last month in which the respective report was produced.

HECO provides Attachments 2A through 2E and 3 through 6 subject to Amended Protective Order No. 23378 as they include recorded financial information that should not be disclosed publicly in advance of the release of associated public financial statements, confidential operational and forward-looking financial information, and critical infrastructure information that is related to the security of the Company's facilities.

As stated below, HECO objects to providing internally distributed management reports and narrative discussions of the reasons for budget variances, on the grounds that: 1) these documents are privileged and confidential and should not be provided on public policy grounds, and 2) explanations generally would be required as to how unadjusted budget numbers relate to test year numbers to be meaningful, which would be unduly burdensome to provide.

Explanations of budget variances are communicated through various media ranging from telephone conversations, brief and informal notes, to more standard write-ups containing explanations in "bullet point" form. The explanations are intentionally brief in nature since Company personnel understand the context behind the drivers of the variances and the Company believes that it is not cost effective to spend the time to generate elaborate variance explanations. If the Company is required to produce internally generated variance information at the time of rate cases, then the information will have to be generated in a

fashion suitable for external publication, rather than in its present form used for internal management purposes. This would be unduly burdensome, as well as counter productive.

These internal reports are intended solely to be a management tool, and are not required to be submitted to management in a form to be transmitted outside the Company. Were these documents subject to review in a regulatory proceeding, their candid nature and, therefore, their value would diminish significantly in the future, and HECO's internal communications would be seriously hampered.

This information request basically requests unlimited access to internal reports or documents submitted in connection with the operating forecast and variances from the operating forecast and other operational information. The information request fails to balance the Consumer Advocate's need for this information against the Company's need to manage.

For example, the Federal Freedom of Information Act ("FFIA"), codified at 5 U.S.C. Section 552, and the Uniform Information Practices Act (modified), codified at H.R.S. Ch. 92F, contains broad disclosure requirements based on the public's interest in open government. However, even such broad disclosure acts provide exceptions from the broad disclosure requirements that are intended to permit the efficient and effective functioning of government. It is common in such acts to protect from disclosing pre-decisional agency memoranda and notes, and/or government records that, by their nature, must be confidential in order to avoid the frustration of a legitimate government function. This is similar to the "deliberative process privilege" recognized by the Pennsylvania Public Utility Commission with respect to its own internal staff reports.

See Pennsylvania Public Utility Commission v. West Penn Power company, 73 Pa PUC 122 (July 20, 1990).

HECO also objects to disclosure of the requested information under a protective order. The value of the internal management reports will be diminished for the reasons stated above if the Company is required to provide the reports to the Consumer Advocate, even if the reports are provided pursuant to a protective order.

Providing variance to budget explanations was raised as an issue by the Consumer Advocate in MECO's 1992-1993 test year rate case, Docket No. 7000. MECO (and essentially HECO and HELCO, or the Companies) and the Consumer Advocate reached agreement in Docket No. 7000 to separate from Docket No. 7000 the Budget Preparation Process/Budget Issues, including the type and amount of information to be provided to the Consumer Advocate between rate cases. MECO and the Consumer Advocate agreed to work together outside of Docket No. 7000 to resolve the budgeting and reporting issues. As a result of the discussions to resolve the issues, among other things, the Companies agreed to provide detailed recorded data files and forecast detailed data files for the link year as part of each subsequent rate case filing. (See transmittal letter dated January 29, 2007 in this proceeding indicating the filing of these data files.) In this case, HECO has provided (as part of its direct testimonies filed in the rate case) explanations of variances by activity, above a threshold, between the budget prepared for the test year and the full year actual information. (See for example HECO-WP-601 and HECO-1002 submitted in this proceeding.) HECO also has responded to numerous specific information requests regarding its test year estimates, and its actual expenses from earlier years. Thus, HECO has provided a significant amount of information as a result of prior agreements in order for

the Consumer Advocate and the Commission to determine the reasonableness of HECO's test year expenses.

c. The Company objects to providing the requested reports on the grounds provided in the response to subpart b. Without waiving its objections, the Company provides the following information. Other financial analyses and budget variance reports prepared by or for the use of the Manager, Operations & Maintenance are also listed in Attachment 1 to this response. Copies of the most current versions of those reports are provided in Attachments 8 to 12 to this response.

HECO provides Attachments 8, 9, 11 and 12 subject to Amended Protective Order No. 23378 as they include recorded financial information that should not be disclosed publicly in advance of the release of associated public financial statements, and confidential operational and forward-looking financial information.

HAWAIIAN ELECTRIC COMPANY, INC.
2007 RATE CASE
Power Supply O&M Department Management Reporting

ATTACHMENT #	Report Title	Freq	Recurring Report	PS O&M Dept. Management Staff					Report Description
				Mgr, O&M	Station Supt, Hon & Waiau	Station Supt, Kahe	Supt, Plng & Engr	Supt, Maint	
Recurring Monthly Operational or Financial Reports:									
2A to 2E	Forward Looking Financial Update	Monthly	Yes	X	X	X	X	X	Power Point presentation prepared by Administrators/Budget Analyst to report to Managers and Executive Management the financial status and year end outlook and process area goals.
3	PSOM Year End O&M Expense Projection Spreadsheet	Monthly	Yes	X			X	X	Spreadsheet lists monthly actual and estimated O&M expense by cost and work category. This is utilized by the Maintenance Superintendent to develop and update year end O&M expense projection for Power Supply O&M Department.
4	Monthly Budget Variance Report	Monthly	Yes	X				X	Budget Analyst prepares the monthly O&M budget variance report that includes explanations for significant differences. Report is reviewed and approved by the Maintenance Superintendent and then submitted to Management Accounting & Financial Services Department.
5	PSOM Vacancy Status	Monthly	Yes	X					List of Power Supply O&M Department staff vacancies and hiring status from Workforce Staffing & Development Department.
6	Monthly Project Inactivation Status Report	Monthly	Yes	X			X		The monthly project activation report is prepared to monitor open projects (e.g. planned maintenance outages), and identify projects to be closed out in Ellipse. Projects are closed when all work for the project has been completed and expenses paid.
CA-IR-333	Monthly Work Order Backlog Report	Monthly	Yes	X			X		The monthly work order backlog report is prepared to monitor the number of outstanding work orders.
7	Not Used.								

ATTACHMENT #	Report Title	Freq	Recurring Report	PS O&M Dept. Management Staff					Report Description
				Mgr, O&M	Station Supt, Hon & Waiau	Station Supt, Kahe	Supt, Plng & Engr	Supt, Maint	
Other Financial Analyses & Budget Variance Reports:									
8	O&M Budget Weekly Report	Weekly	Yes	X	X	X	X	X	Report to track and review budget variance and projected expenses for (1) selected maintenance work by station, (2) PS O&M Program P00061271, (3) substation distributed generation non-labor costs, & (4) Operating Division expenses. Each week major O&M budget line items are reviewed by all Superintendents, Budget Analyst, and O&M Engineers.
9	Weekly O&M Expense Update	Weekly	Yes	X	X	X	X	X	Weekly update of O&M expense by department and consolidated process area reported to VP Power Supply.
10	Bi-Weekly Project Commitment Report	Bi-Weekly	Yes				X		Report lists outstanding commitments by project overhaul. A bi-weekly project commitment meeting, facilitated by Sr. Supervisor, Planning, is held to (a) review outstanding material and outside service costs to determine validity of the expenses (e.g. a reduced work scope could result in reduced expenses), and (b) address timing of the expenses (e.g. it may be necessary to call contractors providing services to submit their invoice), (c) identify any additional non-labor expenses resulting from recent identification of work which was not identified previously.
11	Quarterly O&M Variance Report	Quarter	Yes	X				X	Report prepared by Adminstrator to review and explain O&M expense quarter variance between current year and prior year actual results. Report is reviewed and approved by the Maintenance Superintendent and then submitted to Management Accounting & Financial Services Department.
12	Account Spending Analysis Detail Report	Quarter	Yes	X					Transaction listing of purchases with the company credit card made by authorized Power Supply O&M Department employees. Report is reviewed by Power Supply O&M Department Manager.

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ATTACHMENT 1
PAGE 2 OF 2

CA-IR-408
DOCKET NO. 2006-0386
ATTACHMENTS 2A-12

Attachments 2A-12 are voluminous and available for inspection at HECO's Regulatory Affairs Division office, Suite 1301, Central Pacific Plaza, 220 South King Street, Honolulu, Hawaii. Please contact Dean Matsuura at 543-4622 to make arrangements to inspect these documents. Electronic versions of the attachments are being provided.

Attachments 2A-2E, 3-6, 8, 9, 11, and 12 contain confidential information and are being provided subject to Amended Protective Order No. 23378, dated June 4, 2007.

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	A	B	C	D	E	F	G	H	I	J
1	PROJ	Type	Reqn	Item	PO	Item	SUPPLIER_NAME	desc	po_amt	Commit
2	G0012861	I	F26348	0001				CLOTH, FIBERGLASS, GRAY		$649
3	G0012864	I	E26388	0001				SHIM, BRASS, SIZE: .015 X 6" X 100"		$19
4	G0012860	S	120716	001	P98955	001	AIRGAS GASPRO, INC.	RENTAL 0F 50 ARGON CYLIDERS AT 18 CYLIND	5825	$222
5	G0012859	S	118924	001	P97488	001	BERING SEA ECCOTECH, INC.	8 ea. Contract Helpers Assist for 15 wks	100000	$15,245
6	P0000846	S	118924	001	P97488	001	BERING SEA ECCOTECH, INC.	8 ea. Contract Helpers Assist for 15 wks	100000	$2,690
7	P0000846	S	123855	004	V01851	004	DISCREET AGENTS GUARD SERVICES,	INV# 06-1513 SER DATE 0/29 TO 02/03/07	1560.21	$1,560
8	G0012861	S	124901	001	V02772	001	FURMANITE HAWAII	K1 15 FWH CHANNEL OUTLET STOP VALVE REP.	1801.05	$1,801
9	G0012859	S	122670	001	V00766	001	HAWAIIAN LIFT TRUCK INC	K1 OH, FORKLIFT RENTAL, SN: A875B08256X	3700	$928
10	G0012859	S	122670	002	V00770	001	HAWAIIAN LIFT TRUCK INC	K1 OH, FORKLIFT RENTAL, SN: A875B30847B	4500	$1,184
11	G0012859	S	122670	004	V00770	003	HAWAIIAN LIFT TRUCK INC	K1 OH, FORKLIFT RENTAL, SN: A875B31711B	5400	$488
12	G0012859	S	123317	001	V01357	002	HSI ELECTRIC, INC.	K1 #11 BFP MOTOR RECONDITION AND ROTOR B	9151.83	$9,152
13	G0012859	S	123257	001	V01363	001	ROLLOFFS HAWAII, INC.	K1 OH ROLL-OFFS HAWAII TO PROVIDE CONTA	3500	$1,066
14	G0012859	S	123259	001	V01363	002	ROLLOFFS HAWAII, INC.	K1 OH STACK AND BOILER ASH DISPOSAL AND	5800	$1,626
15	G0012864	S	123257	001	V01363	001	ROLLOFFS HAWAII, INC.	K1 OH ROLL-OFFS HAWAII TO PROVIDE CONTA	3500	$355
16	G0012859	S	123765	001	V01895	001	SIEMENS INDUSTRIAL SERVICES	K1 CR PROVIDE TEMP AMMETER TO USE UNTIL	1013.61	$1,014
17	G0012864	S	118950	001	P97489	001	TENTS HAWAII	K4 O/H. Install 2 ea 30' X 30' tents for	33625	$1,499
18	G0012859	S	120986	001	P99247	001	WFI GOVERNMENT SERVICES, INC.	K1 (1) WELDER, TO REPAIR BLR EXPANSION	15000	$4,295
19	G0012861	S	120986	001	P99247	001	WFI GOVERNMENT SERVICES, INC.	K1 (1) WELDER, TO REPAIR BLR EXPANSION	15000	$1,432
20	G0012861	S	122449	001	V00506	001	WFI GOVERNMENT SERVICES, INC.	KI APH SWIVEL ARM FABRICATION, REPAIRS A	14183.19	$14,183
21	G0012861	S	126499	001	V04198	001	WFI GOVERNMENT SERVICES, INC.	K1 APH SOOOTBLOWER ARM AIR BOX REPAIRS.	18256.59	$18,257
22	G0012861	S	126504	001	V04198	002	WFI GOVERNMENT SERVICES, INC.	K1 APH SOOTBLOWER ARM MACHINING WORK.	1672.98	$1,673
23										
24										
25								**Total Commitments:**		**$79,337**

	A	B	C	D	E	F	G	H	I	J
1	PROJ	Type	Reqn	Item	PO	Item	SUPPLIER_NAME	desc	po_amt	Commit
2	P0000845	S	115753	001	P94462	001	PROCESS CONTROLS, INC.	Caltrol Flowscanner Testing for Kahe 4:	14531.25	$14,531
3	G0012312	S	113717	001	P92936	001	INC.	K4 2006 BRULS & HiEL-Mainland	23600	$2,000
4										
5										
6								**Total Commitments:**		**$16,531**

	A	B	C	D	E	F	G	H	I	J
1	PROJ	Type	Reqn	Item	PO	Item	SUPPLIER_NAME	desc	po_amt	Commit
2	G0013808	I	D27016	0002				SEAT, BUCKET, AIR CUSHIONED, 5 GALLON		$12
3	G0013810	P	129381	001				W-7 CONDENSER CIRCULATING WATER		$115,499
4	*G0013800*	*S*	*126964*	*001*	*V04594*	*001*	*ACA SERVICES, INC.*	*W7 O/H. Rebabbitt 2 ea 3.5" brgs.*	6350	$51
5	G0013808	S	124324	001	V02852	001	ACA SERVICES, INC.	W7 O/H. Prvd svc of 1 MW & 2 Apprentices	72500	$8,931
6	G0013808	S	126493	001	V04194	001	ACA SERVICES, INC.	W7 O/H. Prvd L/M to rebabbit two brgs.	10500	$176
7	G0013808	S	127076	001	V04825	001	ACA SERVICES, INC.	W7 O/H. Prvd labor to repair stationary	72250	$210
8	G0013809	S	124324	001	V02852	001	ACA SERVICES, INC.	W7 O/H. Prvd svc of 1 MW & 2 Apprentices	72500	$2,233
9	G0013809	S	126041	001	V04140	001	ACA SERVICES, INC.	W7 O/H. Prvd L/M rpr LP spindle. Weld/	52500	$145
10	*G0013809*	*S*	*126298*	*001*	*V04370*	*001*	*ACA SERVICES, INC.*	*W7 O/H. Prvd L/M to rpr HP rotor as fol:*	*27000*	*$90*
11	G0013809	S	127168	001	V04826	001	ACA SERVICES, INC.	W7 O/H. Prvd L/M te solder rpr CDP imp.	1000	$5
12	G0013801	P	128367	001	V05763	001	AIR LIQUIDE AMERICA CORP.	Tempstik Test Kit	1105.7376	$1,106
13	G0013801	S	125211	002	V03069	002	AIR LIQUIDE AMERICA CORP.	Rack Rental	41.88	$42
14	G0013801	S	125211	004	V03069	004	AIR LIQUIDE AMERICA CORP.	Rack Rental	41.88	$42
15	G0013802	S	127943	001	V05458	001	AIR LIQUIDE AMERICA CORP.	Argon Gas	1517.4	$1,517
16	G0013802	S	127943	002	V05458	002	AIR LIQUIDE AMERICA CORP.	Cylinder Rental Charge for 2 weeks	1290	$1,290
17	P0001106	S	129205	004	V06598	004	AKAL SECURITY	INV# 150639 WPP SD BIKE GATE	853.3	$853
18	P0001106	S	129205	005	V06598	005	AKAL SECURITY	INV# 150639 WPP SD TOWN GATE	822.36	$822
19	G0013809	S	128596	001	V05971	001	AMERICAN EFFICIENCY SERVICES,	W7 & K1 HELIUM LEAK DETECTION SERVICES	15000	$7,500
20	G0013800	S	124492	001	V02853	001	AMERICAN INDUSTRIAL INSULATION,	W-7 Blr Asbestos Abatement labor assist	150000	$51,931
21	G0013800	S	125610	001	V03759	001	AMERICAN INDUSTRIAL INSULATION,	6 ea contract helper assist for 9 weeks	80000	$13,484
22	G0013801	S	124492	001	V02853	001	AMERICAN INDUSTRIAL INSULATION,	W-7 Blr Asbestos Abatement labor assist	150000	$11,128
23	G0013802	S	124492	001	V02853	001	AMERICAN INDUSTRIAL INSULATION,	W-7 Blr Asbestos Abatement labor assist	150000	$11,128
24	G0013802	S	125610	001	V03759	001	AMERICAN INDUSTRIAL INSULATION,	6 ea contract helper assist for 9 weeks	80000	$3,371
25	G0013800	S	125820	001	V03859	001	ATLAS SALES CO., INC. - KAPOLEI	W7 OH VARIOUS BRULS/STACK SCAFFOLD	40000	$8,000
26	G0013800	S	125822	001	V03555	001	ATLAS SALES CO., INC. - KAPOLEI	W7 OH GR FAN SCAFFOLD #6436	600	$200
27	G0013801	S	125820	001	V03859	001	ATLAS SALES CO., INC. - KAPOLEI	W7 OH VARIOUS BRULS/STACK SCAFFOLD	40000	$32,000
28	G0013801	S	125821	001	V03554	001	ATLAS SALES CO., INC. - KAPOLEI	W7 OH BLR INTERIOR SCAFFOLDING	18000	$18,000
29	G0013801	S	125825	001	V03558	001	ATLAS SALES CO., INC. - KAPOLEI	W7 FIREBOX EXT. SCAFFOLD #6439	700	$220
30	G0013801	S	125826	001	V03559	001	ATLAS SALES CO., INC. - KAPOLEI	W7 OH SCAFFOLD CRH HNGER #6440	2000	$500
31	G0013801	S	125831	001	V03564	001	ATLAS SALES CO., INC. - KAPOLEI	W7 0H SCAFFOLD BRULS #6446	700	$286
32	G0013801	S	125832	001	V03565	001	ATLAS SALES CO., INC. - KAPOLEI	W7 OH SCAFFOLDING BRULS #6447	700	$268
33	G0013801	S	126100	001	V03861	001	ATLAS SALES CO., INC. - KAPOLEI	W7 WIND BOX SCAFFOLD #6448	600	$168
34	G0013801	S	126102	001	V03863	001	ATLAS SALES CO., INC. - KAPOLEI	W7 MAUKA WW SCAFFOLD #6450	1200	$360

	A	B	C	D	E	F	G	H	I	J
35	G0013801	S	126103	001	V03864	001	ATLAS SALES CO., INC. - KAPOLEI	W7 MAUKA WW SCAFFOLD #5106	600	$180
36	G0013801	S	126108	001	V03868	001	ATLAS SALES CO., INC. - KAPOLEI	W7 WW HDR SCAFFOLD #5110	600	$204
37	G0013801	S	126109	001	V03869	001	ATLAS SALES CO., INC. - KAPOLEI	W7 BLR SCAFFOLD MODIFICATION #5111	600	$195
38	G0013801	S	126384	001	V04015	001	ATLAS SALES CO., INC. - KAPOLEI	W7 BRULS SCAFFOLD #5116	1700	$476
39	G0013801	S	126385	001	V04016	001	ATLAS SALES CO., INC. - KAPOLEI	W7 CHEMICAL CLEAN SCAFFOLD #5117	1200	$336
40	G0013801	S	127229	001	V04808	001	ATLAS SALES CO., INC. - KAPOLEI	CHEMICAL CLEAN SCAFFOLD #5124	600	$240
41	G0013801	S	127234	001	V04813	001	ATLAS SALES CO., INC. - KAPOLEI	CHEMICAL CLEAN SCAFFOLD #5129	800	$152
42	G0013801	S	127236	001	V04815	001	ATLAS SALES CO., INC. - KAPOLEI	CHEMICAL CLEAN SCAFFOLD # 5131	500	$140
43	G0013801	S	127238	001	V04817	001	ATLAS SALES CO., INC. - KAPOLEI	CHEMICAL CLEAN SCAFFOLD # 5133	800	$152
44	G0013802	S	125828	001	V03561	001	ATLAS SALES CO., INC. - KAPOLEI	W7 OH SCAFFOLD 71 BFP #6443	700	$286
45	G0013802	S	125829	001	V03562	001	ATLAS SALES CO., INC. - KAPOLEI	W7 OH SCAFFOLD 72 BFP #6444	700	$286
46	G0013802	S	129021	001	V06371	001	ATLAS SALES CO., INC. - KAPOLEI	W7 OH DRAIN PIPING SCAFFOLD #5136	500	$500
47	G0013808	S	125827	001	V03560	001	ATLAS SALES CO., INC. - KAPOLEI	W7 SCAFFOLD RH INTERCEPT #6441	800	$360
48	G0013808	S	126105	001	V03866	001	ATLAS SALES CO., INC. - KAPOLEI	W7 LP TURBINE SCAFFOLD # 5108	900	$252
49	G0013808	S	126820	001	V04430	001	ATLAS SALES CO., INC. - KAPOLEI	Scaffold #71 Chiller #5121	400	$112
50	G0013808	S	126823	001	V04432	001	ATLAS SALES CO., INC. - KAPOLEI	Scaffold Condensor control valve #5118	500	$140
51	G0013808	S	127230	001	V04809	001	ATLAS SALES CO., INC. - KAPOLEI	HP OUTTER CYL SCAFFOLD #5125	600	$168
52	G0013808	S	127231	001	V04810	001	ATLAS SALES CO., INC. - KAPOLEI	LP INNER CYL SCAFFOLD # 5126	600	$168
53	G0013808	S	127232	001	V04811	001	ATLAS SALES CO., INC. - KAPOLEI	RH INTERCEPT VLV SCAFFOLD # 5127	400	$40
54	G0013808	S	127233	001	V04812	001	ATLAS SALES CO., INC. - KAPOLEI	LP INNER CYL SCAFFOLD # 5128	200	$20
55	G0013808	S	127679	001	V05224	001	ATLAS SALES CO., INC. - KAPOLEI	71 CHILLER SCAFFOLD #5134	500	$212
56	G0013809	S	126381	001	V04012	001	ATLAS SALES CO., INC. - KAPOLEI	W7 LP TURBINE SCAFFOLD #5113	400	$148
57	G0013809	S	126821	001	V04431	001	ATLAS SALES CO., INC. - KAPOLEI	Scaffold for HP turbine #5120	600	$168
58	G0013808	S	125217	001	V03244	001	BAE SYSTEMS HAWAII SHIPYARDS INC	W7 O/H. Prvd 2 mech to assist w/turbine	70000	$12,424
59	G0013809	S	125217	001	V03244	001	BAE SYSTEMS HAWAII SHIPYARDS INC	W7 O/H. Prvd 2 mech to assist w/turbine	70000	$3,106
60	G0013800	S	125389	001	V03134	001	BERING SEA ECCOTECH, INC.	W7 OH HEAT EXCHANGER HYDROBLASTING	20000	$16,000
61	G0013800	S	125481	001	V03243	001	BERING SEA ECCOTECH, INC.	7 ea Contract Helpers for W7 O/H	6305.41	$6,305
62	G0013802	S	125391	001	V03136	001	BERING SEA ECCOTECH, INC.	W7 OH APH BASKET HYDROBLASTING SVC	22000	$22,000
63	G0013808	S	125389	001	V03134	001	BERING SEA ECCOTECH, INC.	W7 OH HEAT EXCHANGER HYDROBLASTING	20000	$4,000
64	G0013808	S	127167	001	V04824	001	BERING SEA ECCOTECH, INC.	W7 O/H. Prvd labor to cln S/B shed.	3500	$2,800
65	G0013809	S	127167	001	V04824	001	BERING SEA ECCOTECH, INC.	W7 O/H. Prvd labor to cln S/B shed.	3500	$700
66	G0013810	S	127982	001	V05560	001	BERING SEA ECCOTECH, INC.	W7 TRANSFORMER ROCK REMOVAL SVC	21000	$21,000
67	P0001106	S	129091	001	V06490	001	BERING SEA ECCOTECH, INC.	W-7 OVERHAUL CLEAN-UP - PROVIDE SERVICES	7500	$7,500
68	P0001106	S	129093	001	V06490	002	BERING SEA ECCOTECH, INC.	W-7 OVERHAUL CLEAN UP - PROVIDE SERVICES	7500	$7,500

	A	B	C	D	E	F	G	H	I	J
69	G0013801	P	127791	001	V05435	001	BJ PROCESS AND PIPELINE SERVICES	PCI-20 Inhibitor for W7 CC	5225	$5,225
70	G0013801	S	125214	001	V03132	001	BJ PROCESS AND PIPELINE SERVICES	BJ Services Consultant Fees for	21812.5	$21,813
71	P0001106	S	124978	001	V02765	001	C.S. SQUARED	Engineering services for CS Squared	48000	$19,200
72	P0001106	S	124978	002	V02765	002	C.S. SQUARED	Engieering services for CS Squared	45000	$18,000
73	P0001106	S	124978	003	V02765	003	C.S. SQUARED	Engineering services for CS Squared	21000	$8,400
74	G0013800	S	126899	001	V04596	001	CENTRAL PACIFIC CONTROLS, LLC	W7 YARWAY CLEAN,INSP,CAL, S/N 36694	6314.14	$1,958
75	G0013800	S	126899	002	V04596	002	CENTRAL PACIFIC CONTROLS, LLC	W7 YARWAY CLEAN,INSP,CAL, S/N 21073	8367.54	$2,145
76	G0013800	S	126899	003	V04596	003	CENTRAL PACIFIC CONTROLS, LLC	W7 YARWAY CLEAN,INSP,CAL, S/N 21074	9574.87	$2,067
77	G0013809	S	128480	001	V05882	001	CONCO SERVICES CORPORATION	CONCO SERVICES WILL PROVIDE HELIUM VACUU	9125	$4,563
78	G0013800	S	124097	001	V01990	001	CONTROL COMPONENTS, INC.	W7 VLC-23 REPAIR CAGE & DISC ASSY	5400	$5,400
79	G0013800	S	126784	001	V04580	001	CRANE VALVE SERVICES	Inspect and measurements of interna	20000	$20,000
80	G0013808	S	126175	001	V03871	002	CWR HAWAII, INC.	W7 O/H. Prvd L/M to 200% proof test 4	1300	$11
81	G0013809	S	126174	001	V03871	001	CWR HAWAII, INC.	W7 O/H. Prvd L/M to 200% proof test of 4	850	$32
82	G0013801	S	127671	001	V05220	001	DELTA COMMUNICATIONS, INC.	W7 CHEM CLEAN RADIO RENTALS (8 SETS)	1000	$254
83	G0013808	S	124318	001	V02240	001	DON'S MAKIKI INC.	W7 O/H. Prvd hauling svc of turb parts.	7000	$826
84	G0013809	S	124318	001	V02240	001	DON'S MAKIKI INC.	W7 O/H. Prvd hauling svc of turb parts.	7000	$2,477
85	G0013810	S	127442	001	V05304	001	ECKARD BRANDES, INC.	W-7 #71 & #72 CONDENSER DISCHARGE PIPING	174229.35	$174,229
86	G0013802	S	125496	001	V03247	001	FURMANITE HAWAII	1 ea Contract Mechanic for 7 weeks	10099.73	$9,090
87	G0013802	S	126897	001	V04595	001	FURMANITE HAWAII	MANUFACTURE 4" SEAL RING	600	$600
88	G0013802	S	126897	002	V04595	002	FURMANITE HAWAII	MANUFACTURE 3-WAY VLV SEAL RING	1100	$1,100
89	G0013802	S	126897	003	V04595	003	FURMANITE HAWAII	MANUFACTURE MS STOP SEAL RING	1100	$1,100
90	P0001106	S	124310	001	V02193	001	HAWAII MODULAR SPACE, INC.	W7 overhaul. Prvd svc to haul 24' office	400	$60
91	P0001106	S	125365	001	V03120	001	HAWAII MODULAR SPACE, INC.	Trailer and steps rental, delivery,	3670	$1,102
92	G0013808	S	124422	001	V02759	001	HAWAIIAN CRANE & RIGGING LTD	W7 O/H. Prvd crane svc for W7 O/H.	25000	$8,128
93	G0013809	S	124422	001	V02759	001	HAWAIIAN CRANE & RIGGING LTD	W7 O/H. Prvd crane svc for W7 O/H.	25000	$8,128
94	G0013801	S	125486	001	V03578	001	HAWAIIAN DREDGING	2 ea. Contract Boilermakers for 9 weeks	89000	$9,995
95	G0013801	S	125493	001	V03579	001	HAWAIIAN DREDGING	4 ea. Contract Boilermakers for 9 weeks	171000	$27,391
96	G0013802	S	125493	001	V03579	001	HAWAIIAN DREDGING	4 ea. Contract Boilermakers for 9 weeks	171000	$7,826
97	G0013808	S	128615	001	V06057	005	HAWAIIAN DREDGING	WAIAU STATION BOILER MAINTENANCE &	56931.1	$8,597
98	G0013810	S	128612	001	V06057	002	HAWAIIAN DREDGING	WAIAU STATION BOILER MAINTENANCE &	43134.7	$7,678
99	G0013810	S	128614	001	V06057	004	HAWAIIAN DREDGING	WAIAU STATION BOILER MAINTENANCE &	72396.66	$5,792
100	P0001106	S	124506	001	V02592	001	HAWAIIAN LIFT TRUCK INC	W7 OH FORKLIFT RENTAL S/N A875B08256X	4500	$1,714
101	P0001106	S	124506	002	V02592	002	HAWAIIAN LIFT TRUCK INC	W7 OH FORKLIFT RENTAL S/N A875B31711B	4500	$467
102	P0001106	S	124506	003	V02592	003	HAWAIIAN LIFT TRUCK INC	W7 OH FORKLIFT RENTAL S/N B875B05233D	4500	$299

	A	B	C	D	E	F	G	H	I	J
103	P0001106	S	125161	001	V02911	001	HAWAIIAN LIFT TRUCK INC	W7 OH FORKLIFT RENTAL A875B08642	4242.94	$0
104	G0013800	S	122720	001	V01369	001	HEAT EXCHANGER SYSTEMS, INC.	HES WILL PERFORM ECT ON THE W71,72,73,74	29800	$17,284
105	G0013808	S	122720	001	V01369	001	HEAT EXCHANGER SYSTEMS, INC.	HES WILL PERFORM ECT ON THE W71,72,73,74	29800	$12,516
106	G0013808	S	127981	001	V05459	001	HONOLULU PAINTING CO LTD	W7 CHILLER INNER COVER COATING	1900	$122
107	G0013808	S	129022	001	V06372	001	HONOLULU PAINTING CO LTD	W-7 # 71 & # 72 CIRCULATING WATER PUMP -	946	$946
108	G0013808	S	129096	001	V06491	001	HONOLULU PAINTING CO LTD	W-7 # 71 & # 72 CIRCULATING WATER PUMP	9500	$9,500
109	G0013810	S	126617	001	V04311	001	HONOLULU PAINTING CO LTD	W-7 #71 & #72 CONDENSATE PUMP CANS -	3898	$3,898
110	G0013810	S	129089	001	V06489	001	HONOLULU PAINTING CO LTD	W-7 # 71 & # 72 CONDENSATE PUMP WELLS -	16481	$16,481
111	G0013800	S	128386	001	V05875	001	HONOMACH INC	W7 O/H. Prvd labor machine out FWH studs	13000	$435
112	G0013809	S	126639	001	V04313	002	HONOMACH INC	W7 O/H. Diaphrgms-rplc centering buttons	16335	$16,335
113	G0013800	S	126376	001	V04018	002	HSI ELECTRIC, INC.	Test, Clean and Recondition	1459.68	$0
114	G0013800	S	126380	001	V04018	005	HSI ELECTRIC, INC.	Test, Clean and Recondition	1950.79	$0
115	G0013809	S	126374	001	V04017	003	HSI ELECTRIC, INC.	W7 OH 72 COND MTR REFURB	1950.79	$0
116	G0013809	S	127260	001	V04858	001	HSI ELECTRIC, INC.	W7 O/H. Prvd L/E to balance CDP impeller	1500	$1,188
117	P0001106	S	124429	001	V02207	001	JANI-KING OF HAWAII, INC.	W7 OH TRVL CREW TRAILER OFFICE CLNG SERV	6000	$2,094
118	G0013810	S	128336	001	V05722	001	KZ SERVICES	W7 XFORMER AGGREGATE DELIVERY SVC	10000	$3,547
119	G0013801	S	125485	001	V03246	001	LKS INSPECTION SERVICES, LLC	Waiau 7 BRULS & HiEL Local resource-	1713.09	$21
120	G0013800	S	126015	001	V03757	001	PARKER ENGINEERING	RFURB VTC-10 VLV TRIM SET	4122.53	$117
121	G0013800	S	126015	002	V03757	002	PARKER ENGINEERING	RFURB VTC-8 VLV TRIM SET	4854.03	$138
122	G0013800	S	126015	003	V03757	003	PARKER ENGINEERING	RFURB VLC-21 VLV TRIM SET	2246.75	$64
123	G0013800	S	126015	004	V03757	004	PARKER ENGINEERING	CONTL VLV REFURB EXPEDITE FEE	2612.5	$74
124	G0013808	S	126015	001	V03757	001	PARKER ENGINEERING	RFURB VTC-10 VLV TRIM SET	4122.53	$60
125	G0013808	S	126015	002	V03757	002	PARKER ENGINEERING	RFURB VTC-8 VLV TRIM SET	4854.03	$71
126	G0013808	S	126015	003	V03757	003	PARKER ENGINEERING	RFURB VLC-21 VLV TRIM SET	2246.75	$33
127	G0013808	S	126015	004	V03757	004	PARKER ENGINEERING	CONTL VLV REFURB EXPEDITE FEE	2612.5	$38
128	G0013808	S	127163	001	V04932	001	PARSONS CORPORATION	W7 O/H. Prvd millwright assist.	31132.29	$24,906
129	G0013809	S	127163	001	V04932	001	PARSONS CORPORATION	W7 O/H. Prvd millwright assist.	31132.29	$6,226
130	G0013800	S	128575	001	V05985	005	PETROCHEM INSULATION INC.	WAIAU STATION INSULATION - PROVIDE	31730.72	$4,189
131	G0013801	S	128682	001	V06060	001	PSC INDUSTRIAL OUTSOURCING INC.	W7 CHEM CLEAN FRAC TANK RENTAL	3582.87	$3,583
132	G0013810	S	127928	001	V05382	001	PVT LAND COMPANY, LTD.	CONSRUCTION DEBRIS DISPOSAL	3000	$3,000
133	P0001106	P	128934	001	V06280	001	RM AUTOMATION, INC.	CURRENT TO PNEUMATIC 3-15psi TRANSDUCER	1657.37	$1,657
134	P0001106	P	128934	002	V06280	002	RM AUTOMATION, INC.	CURRENT TO PNEUMATIC 6-30psi TRANSDUCER	1657.37	$1,657
135	P0001106	P	128934	003	V06280	003	RM AUTOMATION, INC.	CURRENT TO PNEUMATIC 3-27psi TRANSDUCER	2486.055	$2,486
136	P0001106	P	129088	001	V06409	001	RM AUTOMATION, INC.	550-C-T DIN RAIL MOUNT I/P, 3-15 PSIG	1348.05	$1,348

	A	B	C	D	E	F	G	H	I	J
137	P0001106	P	129088	002	V06409	002	RM AUTOMATION, INC.	550-D-T DIN RAIL MOUNT I/P, 3-27 PSIG	1797.4	$1,797
138	P0001106	P	129088	003	V06409	003	RM AUTOMATION, INC.	550-E-T DIN RAIL MOUNT I/P, 6-30 PSIG	1348.05	$1,348
139	P0001106	P	129088	004	V06409	004	RM AUTOMATION, INC.	DIN RAIL MOUNTING ADAPTER	104.5	$105
140	P0001106	P	129088	005	V06409	005	RM AUTOMATION, INC.	3 UNIT MOUNTING MANIFOLD	543.4	$543
141	P0001106	P	129088	006	V06409	006	RM AUTOMATION, INC.	5 UNIT MOUNTING MANIFOLD	428.45	$428
142	G0013804	S	124409	001	V02202	001	SIEMENS INDUSTRIAL SERVICES	W7 MN/AUX XFMR SERV & NDT TESTING	8834	$8,834
143	G0013808	S	124407	001	V02202	002	SIEMENS INDUSTRIAL SERVICES	W7 VOLT REG & EXCITER RHEOSTAT SERVICE	12465	$12,465
144	P0001106	S	129053	001			SIEMENS INDUSTRIAL SERVICES	W7 PROVIDE EXPERTISE SERVICE FOR 150 PSI		$1,519
145	G0013800	S	123608	001	V01524	001	SPCC AND CONSULTING, LLC	W7 STACK PAINTING CONSULTANT (SPCC)	2551.85	$0
146	*G0013808*	*S*	*120725*	*001*	*P99246*	*001*	*SPH CRANE & HOIST INC. DBA*	*W-7&8 GANTRY CRANE - MODIFY CRANE*	*104133.23*	*$104,133*
147	G0013802	S	127409	001	V05047	001	STRUCTURAL INTEGRITY ASSOCIATES	For Waiau 7 corner A April 2007 pre-OH	3500	$3,500
148	G0013808	S	124313	001	V02235	001	TENTS HAWAII	W7 O/H. Prvd 40' X 60' tent for 2 months	11500	$74
149	G0013808	S	124316	001	V02290	001	TENTS HAWAII	W7 O/H. Prvd 30' X 60' tent for S/B turb	11000	$425
150	G0013809	S	124313	001	V02235	001	TENTS HAWAII	W7 O/H. Prvd 40' X 60' tent for 2 months	11500	$222
151	G0013809	S	124316	001	V02290	001	TENTS HAWAII	W7 O/H. Prvd 30' X 60' tent for S/B turb	11000	$638
152	G0013801	S	124392	001	V02599	001	THIELSCH ENGINEERING, INC.	W7 BRULS & HiEL-Mainland Resource	25120	$2,000
153	G0013801	S	128523	001	V05217	002	TRI TOOL, INC.	Rental of 606SB and 206B end prep	2589.51	$2,590
154	G0013800	S	127226	001	V04821	001	UNIVERSAL ASSOCIATES, INC.	FABRICATE VARIOUS FWH GASKETS	712.06	$712
155	G0013800	S	127639	002	V05157	002	UNIVERSAL ASSOCIATES, INC.	LABOR & EQUIP TO REPAIR VLV WEDGE	1518.34	$0
156	G0013802	S	126666	001	V04317	001	UNIVERSAL ASSOCIATES, INC.	VariousExpansion Jnt Corners and Runners	2566	$1
157	G0013802	S	128606	001	V06056	001	UNIVERSAL ASSOCIATES, INC.	W7 OH VARIOUS BLR CASING PNL FABRICATION	6075	$2
158	G0013808	S	128892	001	V06326	001	WILLIAM J BANASKY	W7 OH TECHNICAL SUPPORT	12000	$12,000
159	G0013800	P	127980	001	V05695	001	YOKOGAWA CORPORATION OF AMERICA	TRANSMITTER EJA110A-EMS4B-92EB/FF1/D1	1591.535	$1,592
160										
161										
162								**Total Commitments**		**$1,074,446**

	A	B	C	D	E	F	G	H	I	J
1	PROJ	Type	Reqn	Item	PO	Item	SUPPLIER_NAME	desc	po_amt	Commit
2	G0013072	P	123058	008	V01206	004	BEI HAWAII	2.195 GT SULFURIC ACID - 64017322	1266.991	$6
3	G0013072	S	120468	002	P98949	002	BJ PROCESS AND PIPELINE SERVICES	BJ Services Chemical Cleaning	21314	$21,314
4	G0013072	S	123849	001	V01762	003	ENVIROSERVICES & TRAINING CTR.	H9 CHEM CLEAN WASTE TREATMENT	5644.74	$5,645
5	P0001280	S	120124	001	P98482	001	TOGAMI & CO., LTD.	HPP 12T FORKLIFT RENTAL	1000	$1,000
6										
7										
8								**Total Commitments**		**$27,965**

CA-IR-422

Ref: Response to CA-IR-2, Attachment 7, pages 5, 7 and 10; June Update HECO T-6, page 2 (Emission Fees).

Please provide the following information regarding HECO calculated Emission Fees for 2007:

a. State whether the DOH has accepted and approved the amounts calculated for Honolulu, Kahe and Waiau stations, as set forth at Attachment 7, pages 5, 7 and 10, respectively.

b. If your response to part (a) is negative, please provide copies of the most recently approved actual emission fee calculations (or state they are as provided in response to CA-IR-82, Attachment 1).

c. Has HECO received any indication of the potential for fee waivers in 2007 or 2008?

d. If your response to part (c) of this information request is affirmative, please explain and provide documentation for any information HECO possesses regarding fee waivers.

HECO Response:

a. DOH acceptance or approval of the Company's estimates of emissions fee amounts is not a requirement in the emissions fees calculation process. See response to part (b) below.

b. Copies of HECO's April 27, 2007 submittals to DOH for emission fee payments for 2006 operations are attached as Attachment 1 for Kahe, Attachment 2 for Waiau, and Attachment 3 for Honolulu stations, respectively. Attachments 1 to 3 are voluminous and available for inspection at HECO's Regulatory Affairs Division office, Suite 1301, Central Pacific Plaza, 220 South King Street, Honolulu, Hawaii. Please contact Dean Matsuura at 543-4622 to make arrangements to inspect the requested information. The calculated emission fees are the same as provided in HECO's response to CA-IR-82.

c. No, HECO has not received any indication of the potential for fee waivers in 2007 or 2008 at this time.

d. Not applicable.

Hawaiian Electric Company, Inc. • PO Box 2750 • Honolulu, HI 96840-0001

HECO/C

Sherri-Ann Loo, Esq.
Manager
Environmental Department

April 27, 2007

Mr. Wilfred K. Nagamine
Manager, Clean Air Branch
Hawaii State Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

Subject: 2006 Annual Emissions Inventory and Fees
Kahe Generating Station (CSP -01-C)
Hawaiian Electric Company, Inc. (HECO)

Dear Mr. Nagamine:

In accordance with the subject permit, please find the enclosed 2006 Hawaii Emissions Inventory Reports for the subject facility. In addition, enclosed are HECO's two checks (# 71282 and # 71284) submitted for 2006 operations in the amounts of $398,269.07 (COV) and $97,054.82 (NON).

If you have any question, please call Mr. Bruce Schlieman at 543-4516.

Sincerely,

Enclosures
c (w/o encl): T. Simmons

S2020

HAWAIIAN ELECTRIC COMPANY, INC.

DATE	CHECK NO.
04/24/07	71282
HECO	006201

The attached Check is in Payment of the following invoice(s):

Date	Invoice/Credit Memo	Type	Description	Gross	Discount	Net
04/12/07	04122007A 2007 ANNUAL FEE FOR KPP, CSP NO. 0240-01-C			398269.07		398269.07
			TOTAL	398269.07	0.00	398269.07

REMOVE DOCUMENT ALONG THIS PERFORATION

HAWAIIAN ELECTRIC COMPANY, INC.

Bank of Hawaii
Honolulu, Hawaii
59-102
1213

CHECK NO. 71282

PAY THREE HUNDRED NINETY EIGHT THOUSAND TWO HUNDRED SIXTY NINE DOLLARS AND 7 CENTS

TO THE ORDER OF

DATE	CHECK AMOUNT
04/24/07	*******398,269.07

HI STATE-DEPT. OF HEALTH-CAB
CLEAN AIR SPECIAL FUND - COV
P.O. BOX 3378
HONOLULU HI 96801

⑈071282⑈ ⑆121301028⑆ 0081⑈032688⑈

SEE REVERSE SIDE FOR OPENING INSTRUCTIONS

Hawaiian Electric Company, Inc.
PO BOX 2750 HONOLULU, HI 96840-0001
KS3-AD

HI STATE-DEPT. OF HEALTH-CAB
CLEAN AIR SPECIAL FUND - COV
P.O. BOX 3378
HONOLULU HI 96801

71282

S2020

HAWAIIAN ELECTRIC COMPANY, INC.

DATE	CHECK NO.
04/24/07	71284
HECO	006202

The attached Check is in Payment of the following invoice(s):

Date	Invoice/Credit Memo	Type	Description	Gross	Discount	Net
04/12/07	04122007A 2007 ANNUAL FEE, KPP, CSF		NO. 0240-01-C	97054.82		97054.82
			TOTAL	97054.82	0.00	97054.82

REMOVE DOCUMENT ALONG THIS PERFORATION

HAWAIIAN ELECTRIC COMPANY, INC.

Bank of Hawaii
Honolulu, Hawaii
59-102
1213

CHECK NO. 71284

PAY NINETY SEVEN THOUSAND FIFTY FOUR DOLLARS AND 82 CENTS

TO THE ORDER OF

HI STATE-DEPT OF HEALTH-CAB
CLEAN AIR SPECIAL FUND - NON
P.O. BOX 3378
HONOLULU HI 96801

DATE 04/24/07

CHECK AMOUNT ********97,054.82

⑈071284⑈ ⑆121301028⑆ 0081⑈03268⑈

SEE REVERSE SIDE FOR OPENING INSTRUCTIONS

Hawaiian Electric Company, Inc.
PO BOX 2750 HONOLULU, HI 96840-0001
KS3-AD

HI STATE-DEPT OF HEALTH-CAB
CLEAN AIR SPECIAL FUND - NON
P.O. BOX 3378
HONOLULU HI 96801

71284

2006 HAWAII EMISSIONS INVENTORY REPORT
FACILITY GENERAL INFORMATION FORM

FIPS State-County-Facility ID: 1500300501

DATA REPRESENTATIVE OF JANUARY 1, 2006 - DECEMBER 31, 2006
(Form instructions are located on the Facility General Information Form Instructions)

1) Facility Name: HECO - Kahe Power Plant

2) Permit No(s).: 0240-01-C

3) Physical Facility Address:

Street: 92-200 Farrington Highway

City: Kapolei Zip Code: 96707

4) Emissions Inventory Contact Person Information:

Contact Name:	Phone # + ext:	Fax #	Internet (E-mail) Address:
Bruce Schlieman	808-543-4516	808-543-4511	bruce.schlieman@heco.com
Mailing Address:	Mailing City:	State:	Zip Code:
P.O. Box 2750	Honolulu	HI	96840

5) Identify CERR source type (CERR thresholds found on the first page of the General Instructions):
(select one) Type A: X Type B: Neither:

6) SIC Code (Primary / Secondary): 4911 / 7) NAICS Code: 221112

8) Principal Product: Electrical Generation

9) Facility UTM coordinates (m): Horizontal (x): 590070 (Easting (m)) Vertical (y): 2362250 (Northing (m))

Zone: 4 (Zone 4 or 5) Datum: Old Hawaiian (e.g., NAD 83, NAD 27, or Old Hawaiian)

10) When the 2006 Hawaii Emissions Inventory Report has been completed, please sign and date below.

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record.

Signature: Thomas C. Simmons

Name: Thomas C. Simmons Date: 4/27/07
Responsible Official

Title: VP, Power Supply

Permit No.:	0240-01-C
Date Rec'd:	

FORM F-1

2007 ANNUAL FEE SUMMARY FOR COVERED SOURCES

(FOR AIR POLLUTANTS EMITTED DURING CALENDAR YEAR 2006)

INPUT DATA IN YELLOW COLORED CELLS

1. FACILITY INFORMATION (Signature box to be signed by Responsible Official)

A. Facility Name:	HECO - Kahe Power Plant	B. Location:	92-200 Farrington Highway	C. Island:	Oahu
D. Mailing Address:	P.O. Box 2750	E. City:	Honolulu F. State: HI	G. Zip Code:	96840
H. Contact Person:	Bruce Schlieman	I. Title:	Senior Environmental Scientist	J. Telephone No.:	808-543-4516
K. Responsible Official:	Thomas C. Simmons	L. Title:	VP, Power Supply	M. Telephone No.	(808) 543-4301
N. Signature:	Thomas C. Simmons	Date:	4/27/07		

Based on the information and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete

2. CALCULATED EMISSIONS [Report emissions to the nearest tenth of a ton (Line 2.B.) and total annual emis. (Line 2.C.) subject to fees without the fraction(s) of a ton]

Equipment: Unit No. or Activity No.	Air Pollutant Emissions (tons/yr)												
	Other Regulated Air Pollutants Including Hazardous Air Pollutants (please specify)												Annual Total
	TSP	PM_{10}	$PM_{2.5}$	SO_2	CO	NOx	VOC	Pb	HAPs	NH_3			
K1	110.1	84.1	67.0	795.1	67.8	637.0	10.3	0.0	2.5	--			
K2	128.2	97.8	77.9	926.2	78.9	741.6	12.0	0.0	2.9	--			
K3	138.2	105.5	80.5	998.4	85.1	800.2	12.9	0.0	3.1	--			
K4	116.6	89.0	70.9	842.8	71.8	674.7	10.9	0.0	2.6	--			
A. Supplement (if appl.) A	401.3	299.4	236.4	3215.7	275.6	2076.4	41.9	0.0	10.0	--			
B. Total Report Emissions	894.4	675.8	532.7	6778.2	579.2	4929.9	88.0	0.0	21.1	--			
C. Total Emissions Subject to Fees	894			4,000		4,000	88					D.	8,982

3 ANNUAL FEE CALCULATION (Use the total annual emissions subject to fees calculated in Block 2.D.)

		Total Annual Emissions Subject to Fees (enter 2.D. value below)		Multiply	2006 $/TON	Multiply	CPI Index Adjustmn (3.6% incr. '04 to '05)	Equal		Total
Fee payable to:	"Clean Air Special Fund - COV'	A.	8,982	x	42.80	x	1.036	=	B.	$398,269.07
	"Clean Air Special Fund - NON'	C.	8,982	x	10.43	x	1.036	=	D.	$97,054.82
							Total	=	E.	$495,323.89

Note: 2007 $/ton charge payable to Clean Air Special Fund - COV = $42.80 x 1.036 = $44.34/ton.
2007 $/ton charge payable to Clean Air Special Fund - NON = $10.43 x 1.036 = $10.81/ton.
If the summed amount found in 3.E is less than $500, then pay the minimum amount of $500, with a check made payable to the 'Clean Air Special Fund - COV.'
If the summed amount found in 3.E is greater than $500, then pay the fee amounts found in 3.B & 3.D with two separate checks made payable to the 'Clean Air Special Fund - COV' & 'Clean Air Special Fund - NON,' respectively.

Permit No.:	0240-01-C
Date Rec'd:	

FORM F-2
SUPPLEMENT A
2007 ANNUAL FEE SUMMARY FOR COVERED SOURCES
(FOR AIR POLLUTANTS EMITTED DURING CALENDAR YEAR 2006)

INPUT DATA IN YELLOW COLORED CELLS

1. FACILITY INFORMATION (Signature box to be signed by Responsible Official)

A. Facility Name: HECO - Kahe Power Plant	B. Location: 92-200 Farrington Highway	C. Island: Oahu
D. Responsible Official: Thomas C. Simmons	E. Title: VP, Power Supply	F. Telephone No.: 808-543-4516
G. Signature: Thomas C. Simmons	Date: 4/27/07	
Based on the information and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete		

2. CALCULATED EMISSIONS (Report emissions to the nearest tenth of a ton)

Equipment: Unit No. or Activity No.	Air Pollutant Emissions (tons/yr)											
	Other Regulated Air Pollutants Including Hazardous Air Pollutants (please specify)											
	TSP	PM_{10}	$PM_{2.5}$	SO_2	CO	NOx	VOC	Pb	HAPs	NH_3		
K5	209.8	160.1	127.6	1516.2	129.2	1213.9	19.7	0.0	4.7	--		
K6	191.4	139.2	108.7	1699.5	144.8	856.6	22.0	0.0	5.3	--		
A	0.1	0.1	0.1	0.0	1.0	3.7	0.1	0.0	0.0	--		
B	0.0	0.0	0.0	0.0	0.6	2.2	0.1	0.0	0.0	--		
Supplement ____												
Total Report Emissions	401.3	299.4	236.4	3215.7	275.6	2076.4	41.9	0.0	10.0	--		

Kahe 1 No 6 FO

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	27,057,913	150,273	4,066,074	0.391	M	794.9
NOX	27,057,913	150,273	4,066,074	0.313	A	636.3
CO	27,057,913	150,273	4,066,074	0.0333	A	67.7
VOC	27,057,913	150,273	4,066,074	0.00507	A	10.3
PM-PRI	27,057,913	150,273	4,066,074	0.0541	A	110.0
PM-FIL	27,057,913	150,273	4,066,074	0.0441	A	89.7
PM-CON	27,057,913	150,273	4,066,074	0.0100	A	20.3
PM10-PRI	27,057,913	150,273	4,066,074	0.0413	A	84.0
PM10-FIL	27,057,913	150,273	4,066,074	0.0313	A	63.6
PM25-PRI	27,057,913	150,273	4,066,074	0.0329	A	66.9
PM25-FIL	27,057,913	150,273	4,066,074	0.0229	A	46.6
Acetaldehyde	27,057,913	150,273	4,066,074		A	
Acrolein	27,057,913	150,273	4,066,074		A	
Antimony Compounds	27,057,913	150,273	4,066,074	3.50E-05	A	7.12E-02
Arsenic Compounds	27,057,913	150,273	4,066,074	8.80E-06	A	1.79E-02
Benzene	27,057,913	150,273	4,066,074	1.43E-06	A	2.90E-03
Beryllium Compounds	27,057,913	150,273	4,066,074	1.85E-07	A	3.77E-04
1,3-Butadiene	27,057,913	150,273	4,066,074		A	
Cadmium Compounds	27,057,913	150,273	4,066,074	2.65E-06	A	5.39E-03
Chromium Compounds	27,057,913	150,273	4,066,074	5.63E-06	A	1.15E-02
Cobalt Compounds	27,057,913	150,273	4,066,074	4.01E-05	A	8.16E-02
Ethylbenzene	27,057,913	150,273	4,066,074	4.24E-07	A	8.62E-04
Formaldehyde	27,057,913	150,273	4,066,074	4.07E-04	A	8.27E-01
Hydrochloric Acid	27,057,913	150,273	4,066,074		A	
Lead Compounds	27,057,913	150,273	4,066,074	1.01E-05	A	2.05E-02
Manganese Compounds	27,057,913	150,273	4,066,074	2.00E-05	A	4.07E-02
Mercury Compounds	27,057,913	150,273	4,066,074	7.53E-07	A	1.53E-03
Nickel Compounds	27,057,913	150,273	4,066,074	5.63E-04	A	1.15E+00
Naphthalene	27,057,913	150,273	4,066,074	7.53E-06	A	1.53E-02
Phosphorus	27,057,913	150,273	4,066,074	6.31E-05	A	1.28E-01
POM	27,057,913	150,273	4,066,074	8.67E-06	A	1.76E-02
Selenium Compounds	27,057,913	150,273	4,066,074	4.55E-06	A	9.26E-03
Toluene	27,057,913	150,273	4,066,074	4.13E-05	A	8.40E-02
Xylene	27,057,913	150,273	4,066,074		A	
o-Xylene	27,057,913	150,273	4,066,074	7.27E-07	A	1.48E-03

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Kahe 1 Spec Used Oil

Pollutant	Annual Fuel Use (gal/yr)	Emission Factor (lb/10^3 gal)	EF Ref	Annual Emissions (tons/yr)
SO2	31,181	10.3	A	0.161
NOX	31,181	47	A	0.733
CO	31,181	5	A	0.078
VOC	31,181	0.76	A	0.012
PM-PRI	31,181	5.36	A	0.084
PM-FIL	31,181	3.86	A	0.060
PM-CON	31,181	1.5	A	0.023
PM10-PRI	31,181	4.24	A	0.066
PM10-FIL	31,181	2.74	A	0.043
PM25-PRI	31,181	3.51	A	0.055
PM25-FIL	31,181	2.01	A	0.031
Acetaldehyde	31,181		A	
Acrolein	31,181		A	
Antimony Compounds	31,181		A	
Arsenic Compounds	31,181	1.10E-01	A	1.71E-03
Benzene	31,181		A	
Beryllium Compounds	31,181		A	
1,3-Butadiene	31,181		A	
Cadmium Compounds	31,181	9.30E-03	A	1.45E-04
Chromium Compounds	31,181	2.00E-02	A	3.12E-04
Cobalt Compounds	31,181	2.10E-04	A	3.27E-06
Ethylbenzene	31,181		A	
Formaldehyde	31,181		A	
Hydrochloric Acid	31,181	3.30E-02	A	5.14E-04
Lead Compounds	31,181	5.50E-01	A	8.57E-03
Manganese Compounds	31,181	6.80E-02	A	1.06E-03
Mercury Compounds	31,181		A	
Nickel Compounds	31,181	1.10E-02	A	1.71E-04
Naphthalene	31,181		A	
Phosphorus	31,181		A	
POM	31,181		A	
Selenium Compounds	31,181		A	
Toluene	31,181		A	
Xylene	31,181		A	
o-Xylene	31,181		A	

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Kahe 1 Propane

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	1,696	91,500	155	0.00371	M	0.0003
NOX	1,696	91,500	155	0.208	A	0.0161
CO	1,696	91,500	155	0.0350	A	0.0027
VOC	1,696	91,500	155	0.00546	A	0.0004
PM-PRI	1,696	91,500	155	0.0122	A	0.0009
PM-FIL	1,696	91,500	155	0.00656	A	0.0005
PM-CON	1,696	91,500	155	0.00559	A	0.0004
PM10-PRI	1,696	91,500	155	0.0122	A	0.0009
PM10-FIL	1,696	91,500	155	0.00656	A	0.0005
PM25-PRI	1,696	91,500	155	0.0122	A	0.0009
PM25-FIL	1,696	91,500	155	0.00656	A	0.0005
Acetaldehyde	1,696	91,500	155		A	
Acrolein	1,696	91,500	155		A	
Antimony Compounds	1,696	91,500	155		A	
Arsenic Compounds	1,696	91,500	155		A	
Benzene	1,696	91,500	155		A	
Beryllium Compounds	1,696	91,500	155		A	
1,3-Butadiene	1,696	91,500	155		A	
Cadmium Compounds	1,696	91,500	155		A	
Chromium Compounds	1,696	91,500	155		A	
Cobalt Compounds	1,696	91,500	155		A	
Ethylbenzene	1,696	91,500	155		A	
Formaldehyde	1,696	91,500	155		A	
Hydrochloric Acid	1,696	91,500	155		A	
Lead Compounds	1,696	91,500	155		A	
Manganese Compounds	1,696	91,500	155		A	
Mercury Compounds	1,696	91,500	155		A	
Nickel Compounds	1,696	91,500	155		A	
Naphthalene	*1,696*	*91,500*	*155*		A	
Phosphorus	1,696	91,500	155		A	
POM	1,696	91,500	155		A	
Selenium Compounds	1,696	91,500	155		A	
Toluene	1,696	91,500	155		A	
Xylene	1,696	91,500	155		A	
o-Xylene	1,696	91,500	155		A	

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Kahe 1 Total

Pollutant	Annual Emissions No 6 Fuel Oil (tons/yr)	Spec Used Oil (tons/yr)	Propane (tons/yr)	Total (tons/yr)
SO2	794.9	0.161	0.0003	795.1
NOX	636.3	0.733	0.0161	637
CO	67.7	0.078	0.0027	67.8
VOC	10.3	0.012	0.0004	10.3
PM-PRI	110	0.084	0.0009	110.1
PM-FIL	89.7	0.060	0.0005	89.8
PM-CON	20.3	0.023	0.0004	20.3
PM10-PRI	84	0.066	0.0009	84.1
PM10-FIL	63.6	0.043	0.0005	63.6
PM25-PRI	66.9	0.055	0.0009	67
PM25-FIL	46.6	0.031	0.0005	46.6
Acetaldehyde				
Acrolein				
Antimony Compounds	7.12E-02			7.12E-02
Arsenic Compounds	1.79E-02	1.71E-03		1.96E-02
Benzene	2.90E-03			2.90E-03
Beryllium Compounds	3.77E-04			3.77E-04
1,3-Butadiene				
Cadmium Compounds	5.39E-03	1.45E-04		5.54E-03
Chromium Compounds	1.15E-02	3.12E-04		1.18E-02
Cobalt Compounds	8.16E-02	3.27E-06		8.16E-02
Ethylbenzene	8.62E-04			8.62E-04
Formaldehyde	8.27E-01			8.27E-01
Hydrochloric Acid		5.14E-04		5.14E-04
Lead Compounds	2.05E-02	8.57E-03		2.90E-02
Manganese Compounds	4.07E-02	1.06E-03		4.17E-02
Mercury Compounds	1.53E-03			1.53E-03
Nickel Compounds	1.15E+00	1.71E-04		1.15E+00
Naphthalene	1.53E-02			1.53E-02
Phosphorus	1.28E-01			1.28E-01
POM	1.76E-02			1.76E-02
Selenium Compounds	9.26E-03			9.26E-03
Toluene	8.40E-02			8.40E-02
Xylene				
o-Xylene	1.48E-03			1.48E-03
Total HAPs				2.49E+00

Kahe 2 No 6 FO

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	31,528,181	150,273	4,737,834	0.391	M	926.2
NOX	31,528,181	150,273	4,737,834	0.313	A	741.5
CO	31,528,181	150,273	4,737,834	0.0333	A	78.9
VOC	31,528,181	150,273	4,737,834	0.00507	A	12.0
PM-PRI	31,528,181	150,273	4,737,834	0.0541	A	128.2
PM-FIL	31,528,181	150,273	4,737,834	0.0441	A	104.5
PM-CON	31,528,181	150,273	4,737,834	0.0100	A	23.7
PM10-PRI	31,528,181	150,273	4,737,834	0.0413	A	97.8
PM10-FIL	31,528,181	150,273	4,737,834	0.0313	A	74.1
PM25-PRI	31,528,181	150,273	4,737,834	0.0329	A	77.9
PM25-FIL	31,528,181	150,273	4,737,834	0.0229	A	54.2
Acetaldehyde	31,528,181	150,273	4,737,834		A	
Acrolein	31,528,181	150,273	4,737,834		A	
Antimony Compounds	31,528,181	150,273	4,737,834	3.50E-05	A	8.29E-02
Arsenic Compounds	31,528,181	150,273	4,737,834	8.80E-06	A	2.08E-02
Benzene	31,528,181	150,273	4,737,834	1.43E-06	A	3.38E-03
Beryllium Compounds	31,528,181	150,273	4,737,834	1.85E-07	A	4.39E-04
1,3-Butadiene	31,528,181	150,273	4,737,834		A	
Cadmium Compounds	31,528,181	150,273	4,737,834	2.65E-06	A	6.29E-03
Chromium Compounds	31,528,181	150,273	4,737,834	5.63E-06	A	1.33E-02
Cobalt Compounds	31,528,181	150,273	4,737,834	4.01E-05	A	9.51E-02
Ethylbenzene	31,528,181	150,273	4,737,834	4.24E-07	A	1.00E-03
Formaldehyde	31,528,181	150,273	4,737,834	4.07E-04	A	9.63E-01
Hydrochloric Acid	31,528,181	150,273	4,737,834		A	
Lead Compounds	31,528,181	150,273	4,737,834	1.01E-05	A	2.38E-02
Manganese Compounds	31,528,181	150,273	4,737,834	2.00E-05	A	4.74E-02
Mercury Compounds	31,528,181	150,273	4,737,834	7.53E-07	A	1.78E-03
Nickel Compounds	31,528,181	150,273	4,737,834	5.63E-04	A	1.33E+00
Naphthalene	31,528,181	150,273	4,737,834	7.53E-06	A	1.78E-02
Phosphorus	31,528,181	150,273	4,737,834	6.31E-05	A	1.49E-01
POM	31,528,181	150,273	4,737,834	8.67E-06	A	2.05E-02
Selenium Compounds	31,528,181	150,273	4,737,834	4.55E-06	A	1.08E-02
Toluene	31,528,181	150,273	4,737,834	4.13E-05	A	9.79E-02
Xylene	31,528,181	150,273	4,737,834		A	
o-Xylene	31,528,181	150,273	4,737,834	7.27E-07	A	1.72E-03

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Kahe 2 Spec Used Oil

Pollutant	Annual Fuel Use (gal/yr)	Emission Factor (lb/10^3 gal)	EF Ref	Annual Emissions (tons/yr)
SO2	1,645	10.3	A	0.008
NOX	1,645	47	A	0.039
CO	1,645	5	A	0.004
VOC	1,645	0.76	A	0.001
PM-PRI	1,645	5.36	A	0.004
PM-FIL	1,645	3.86	A	0.003
PM-CON	1,645	1.5	A	0.001
PM10-PRI	1,645	4.24	A	0.003
PM10-FIL	1,645	2.74	A	0.002
PM25-PRI	1,645	3.51	A	0.003
PM25-FIL	1,645	2.01	A	0.002
Acetaldehyde	1,645		A	
Acrolein	1,645		A	
Antimony Compounds	1,645		A	
Arsenic Compounds	1,645	1.10E-01	A	9.05E-05
Benzene	1,645		A	
Beryllium Compounds	1,645		A	
1,3-Butadiene	1,645		A	
Cadmium Compounds	1,645	9.30E-03	A	7.65E-06
Chromium Compounds	1,645	2.00E-02	A	1.65E-05
Cobalt Compounds	1,645	2.10E-04	A	1.73E-07
Ethylbenzene	1,645		A	
Formaldehyde	1,645		A	
Hydrochloric Acid	1,645	3.30E-02	A	2.71E-05
Lead Compounds	1,645	5.50E-01	A	4.52E-04
Manganese Compounds	1,645	6.80E-02	A	5.59E-05
Mercury Compounds	1,645		A	
Nickel Compounds	1,645	1.10E-02	A	9.05E-06
Naphthalene	1,645		A	
Phosphorus	1,645		A	
POM	1,645		A	
Selenium Compounds	1,645		A	
Toluene	1,645		A	
Xylene	1,645		A	
o-Xylene	1,645		A	

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Kahe 2 Propane

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	1,819	91,500	166	0.00371	M	0.0003
NOX	1,819	91,500	166	0.208	A	0.0173
CO	1,819	91,500	166	0.0350	A	0.0029
VOC	1,819	91,500	166	0.00546	A	0.0005
PM-PRI	1,819	91,500	166	0.0122	A	0.0010
PM-FIL	1,819	91,500	166	0.00656	A	0.0005
PM-CON	1,819	91,500	166	0.00559	A	0.0005
PM10-PRI	1,819	91,500	166	0.0122	A	0.0010
PM10-FIL	1,819	91,500	166	0.00656	A	0.0005
PM25-PRI	1,819	91,500	166	0.0122	A	0.0010
PM25-FIL	1,819	91,500	166	0.00656	A	0.0005
Acetaldehyde	1,819	91,500	166		A	
Acrolein	1,819	91,500	166		A	
Antimony Compounds	1,819	91,500	166		A	
Arsenic Compounds	1,819	91,500	166		A	
Benzene	1,819	91,500	166		A	
Beryllium Compounds	1,819	91,500	166		A	
1,3-Butadiene	1,819	91,500	166		A	
Cadmium Compounds	1,819	91,500	166		A	
Chromium Compounds	1,819	91,500	166		A	
Cobalt Compounds	1,819	91,500	166		A	
Ethylbenzene	1,819	91,500	166		A	
Formaldehyde	1,819	91,500	166		A	
Hydrochloric Acid	1,819	91,500	166		A	
Lead Compounds	1,819	91,500	166		A	
Manganese Compounds	1,819	91,500	166		A	
Mercury Compounds	1,819	91,500	166		A	
Nickel Compounds	1,819	91,500	166		A	
Naphthalene	1,819	91,500	166		A	
Phosphorus	1,819	91,500	166		A	
POM	1,819	91,500	166		A	
Selenium Compounds	1,819	91,500	166		A	
Toluene	1,819	91,500	166		A	
Xylene	1,819	91,500	166		A	
o-Xylene	1,819	91,500	166		A	

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Kahe 2 Total

	Annual Emissions			
Pollutant	No 6 Fuel Oil (tons/yr)	Spec Used Oil (tons/yr)	Propane (tons/yr)	Total (tons/yr)
SO2	926.2	0.008	0.0003	926.2
NOX	741.5	0.039	0.0173	741.6
CO	78.9	0.004	0.0029	78.9
VOC	12	0.001	0.0005	12
PM-PRI	128.2	0.004	0.0010	128.2
PM-FIL	104.5	0.003	0.0005	104.5
PM-CON	23.7	0.001	0.0005	23.7
PM10-PRI	97.8	0.003	0.0010	97.8
PM10-FIL	74.1	0.002	0.0005	74.1
PM25-PRI	77.9	0.003	0.0010	77.9
PM25-FIL	54.2	0.002	0.0005	54.2
Acetaldehyde				
Acrolein				
Antimony Compounds	8.29E-02			8.29E-02
Arsenic Compounds	2.08E-02	9.05E-05		2.09E-02
Benzene	3.38E-03			3.38E-03
Beryllium Compounds	4.39E-04			4.39E-04
1,3-Butadiene				
Cadmium Compounds	6.29E-03	7.65E-06		6.29E-03
Chromium Compounds	1.33E-02	1.65E-05		1.34E-02
Cobalt Compounds	9.51E-02	1.73E-07		9.51E-02
Ethylbenzene	1.00E-03			1.00E-03
Formaldehyde	9.63E-01			9.63E-01
Hydrochloric Acid		2.71E-05		2.71E-05
Lead Compounds	2.38E-02	4.52E-04		2.43E-02
Manganese Compounds	4.74E-02	5.59E-05		4.74E-02
Mercury Compounds	1.78E-03			1.78E-03
Nickel Compounds	1.33E+00	9.05E-06		1.33E+00
Naphthalene	1.78E-02			1.78E-02
Phosphorus	1.49E-01			1.49E-01
POM	2.05E-02			2.05E-02
Selenium Compounds	1.08E-02			1.08E-02
Toluene	9.79E-02			9.79E-02
Xylene				
o-Xylene	1.72E-03			1.72E-03
Total HAPs				2.89E+00

Kahe 3 No 6 FO

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	33,978,862	150,273	5,106,106	0.391	M	998.2
NOX	33,978,862	150,273	5,106,106	0.313	A	799.1
CO	33,978,862	150,273	5,106,106	0.0333	A	85.0
VOC	33,978,862	150,273	5,106,106	0.00507	A	12.9
PM-PRI	33,978,862	150,273	5,106,106	0.0541	A	138.1
PM-FIL	33,978,862	150,273	5,106,106	0.0441	A	112.6
PM-CON	33,978,862	150,273	5,106,106	0.0100	A	25.5
PM10-PRI	33,978,862	150,273	5,106,106	0.0413	A	105.4
PM10-FIL	33,978,862	150,273	5,106,106	0.0313	A	79.9
PM25-PRI	33,978,862	150,273	5,106,106	0.0315	A	80.4
PM25-FIL	33,978,862	150,273	5,106,106	0.0215	A	54.9
Acetaldehyde	33,978,862	150,273	5,106,106		A	
Acrolein	33,978,862	150,273	5,106,106		A	
Antimony Compounds	33,978,862	150,273	5,106,106	3.50E-05	A	8.94E-02
Arsenic Compounds	33,978,862	150,273	5,106,106	8.80E-06	A	2.25E-02
Benzene	33,978,862	150,273	5,106,106	1.43E-06	A	3.64E-03
Beryllium Compounds	33,978,862	150,273	5,106,106	1.85E-07	A	4.73E-04
1,3-Butadiene	33,978,862	150,273	5,106,106		A	
Cadmium Compounds	33,978,862	150,273	5,106,106	2.65E-06	A	6.77E-03
Chromium Compounds	33,978,862	150,273	5,106,106	5.63E-06	A	1.44E-02
Cobalt Compounds	33,978,862	150,273	5,106,106	4.01E-05	A	1.02E-01
Ethylbenzene	33,978,862	150,273	5,106,106	4.24E-07	A	1.08E-03
Formaldehyde	33,978,862	150,273	5,106,106	4.07E-04	A	1.04E+00
Hydrochloric Acid	33,978,862	150,273	5,106,106		A	
Lead Compounds	33,978,862	150,273	5,106,106	1.01E-05	A	2.57E-02
Manganese Compounds	33,978,862	150,273	5,106,106	2.00E-05	A	5.11E-02
Mercury Compounds	33,978,862	150,273	5,106,106	7.53E-07	A	1.92E-03
Nickel Compounds	33,978,862	150,273	5,106,106	5.63E-04	A	1.44E+00
Naphthalene	33,978,862	150,273	5,106,106	7.53E-06	A	1.92E-02
Phosphorus	33,978,862	150,273	5,106,106	6.31E-05	A	1.61E-01
POM	33,978,862	150,273	5,106,106	8.67E-06	A	2.21E-02
Selenium Compounds	33,978,862	150,273	5,106,106	4.55E-06	A	1.16E-02
Toluene	33,978,862	150,273	5,106,106	4.13E-05	A	1.06E-01
Xylene	33,978,862	150,273	5,106,106		A	
o-Xylene	33,978,862	150,273	5,106,106	7.27E-07	A	1.86E-03

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Kahe 3 No 2 FO

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	14,504	140,000	2,031	0.015	M	0.015
NOX	14,504	140,000	2,031	0.171	A	0.174
CO	14,504	140,000	2,031	0.0357	A	0.036
VOC	14,504	140,000	2,031	0.00143	A	0.001
PM-PRI	14,504	140,000	2,031	0.0236	A	0.024
PM-FIL	14,504	140,000	2,031	0.0143	A	0.015
PM-CON	14,504	140,000	2,031	0.00929	A	0.009
PM10-PRI	14,504	140,000	2,031	0.0164	A	0.017
PM10-FIL	14,504	140,000	2,031	0.00714	A	0.007
PM25-PRI	14,504	140,000	2,031	0.0111	A	0.011
PM25-FIL	14,504	140,000	2,031	0.00179	A	0.002
Acetaldehyde	14,504	140,000	2,031		A	
Acrolein	14,504	140,000	2,031		A	
Antimony Compounds	14,504	140,000	2,031	3.75E-05	A	3.81E-05
Arsenic Compounds	14,504	140,000	2,031	4.00E-06	A	4.06E-06
Benzene	14,504	140,000	2,031	1.53E-06	A	1.55E-06
Beryllium Compounds	14,504	140,000	2,031	3.00E-06	A	3.05E-06
1,3-Butadiene	14,504	140,000	2,031		A	
Cadmium Compounds	14,504	140,000	2,031	3.00E-06	A	3.05E-06
Chromium Compounds	14,504	140,000	2,031	3.00E-06	A	3.05E-06
Cobalt Compounds	14,504	140,000	2,031	4.30E-05	A	4.37E-05
Ethylbenzene	14,504	140,000	2,031	4.54E-07	A	4.61E-07
Formaldehyde	14,504	140,000	2,031	4.36E-04	A	4.42E-04
Hydrochloric Acid	14,504	140,000	2,031		A	
Lead Compounds	14,504	140,000	2,031	9.00E-06	A	9.14E-06
Manganese Compounds	14,504	140,000	2,031	6.00E-06	A	6.09E-06
Mercury Compounds	14,504	140,000	2,031	3.00E-06	A	3.05E-06
Nickel Compounds	14,504	140,000	2,031	3.00E-06	A	3.05E-06
Naphthalene	14,504	140,000	2,031	8.07E-06	A	8.19E-06
Phosphorus	14,504	140,000	2,031	6.76E-05	A	6.86E-05
POM	14,504	140,000	2,031	9.29E-06	A	9.43E-06
Selenium Compounds	14,504	140,000	2,031	1.50E-05	A	1.52E-05
Toluene	14,504	140,000	2,031	4.43E-05	A	4.50E-05
Xylene	14,504	140,000	2,031		A	
o-Xylene	14,504	140,000	2,031	7.79E-07	A	7.90E-07

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Kahe 3 Spec Used Oil

Pollutant	Annual Fuel Use (gal/yr)	Emission Factor (lb/10^3 gal)	EF Ref	Annual Emissions (tons/yr)
SO2	37,599	10.3	A	0.194
NOX	37,599	47	A	0.884
CO	37,599	5	A	0.094
VOC	37,599	0.76	A	0.014
PM-PRI	37,599	5.36	A	0.101
PM-FIL	37,599	3.86	A	0.073
PM-CON	37,599	1.5	A	0.028
PM10-PRI	37,599	4.24	A	0.080
PM10-FIL	37,599	2.74	A	0.052
PM25-PRI	37,599	3.51	A	0.066
PM25-FIL	37,599	2.01	A	0.038
Acetaldehyde	37,599		A	
Acrolein	37,599		A	
Antimony Compounds	37,599		A	
Arsenic Compounds	37,599	1.10E-01	A	2.07E-03
Benzene	37,599		A	
Beryllium Compounds	37,599		A	
1,3-Butadiene	37,599		A	
Cadmium Compounds	37,599	9.30E-03	A	1.75E-04
Chromium Compounds	37,599	2.00E-02	A	3.76E-04
Cobalt Compounds	*37,599*	*2.10E-04*	A	*3.95E-06*
Ethylbenzene	37,599		A	
Formaldehyde	37,599		A	
Hydrochloric Acid	37,599	3.30E-02	A	6.20E-04
Lead Compounds	37,599	5.50E-01	A	1.03E-02
Manganese Compounds	37,599	6.80E-02	A	1.28E-03
Mercury Compounds	37,599		A	
Nickel Compounds	37,599	1.10E-02	A	2.07E-04
Naphthalene	37,599		A	
Phosphorus	37,599		A	
POM	37,599		A	
Selenium Compounds	37,599		A	
Toluene	37,599		A	
Xylene	37,599		A	
o-Xylene	37,599		A	

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Kahe 3 Total

	Annual Emissions			
Pollutant	No 6 Fuel Oil (tons/yr)	No 2 Fuel Oil (tons/yr)	Spec Used Oil (tons/yr)	Total (tons/yr)
SO2	998.2	0.015	0.194	998.4
NOX	799.1	0.174	0.884	800.2
CO	85	0.036	0.094	85.1
VOC	12.9	0.001	0.014	12.9
PM-PRI	138.1	0.024	0.101	138.2
PM-FIL	112.6	0.015	0.073	112.7
PM-CON	25.5	0.009	0.028	25.5
PM10-PRI	105.4	0.017	0.080	105.5
PM10-FIL	79.9	0.007	0.052	80
PM25-PRI	80.4	0.011	0.066	80.5
PM25-FIL	54.9	0.002	0.038	54.9
Acetaldehyde				
Acrolein				
Antimony Compounds	8.94E-02	3.81E-05		8.94E-02
Arsenic Compounds	2.25E-02	4.06E-06	2.07E-03	2.45E-02
Benzene	3.64E-03	1.55E-06		3.64E-03
Beryllium Compounds	4.73E-04	3.05E-06		4.76E-04
1,3-Butadiene				
Cadmium Compounds	6.77E-03	3.05E-06	1.75E-04	6.95E-03
Chromium Compounds	1.44E-02	3.05E-06	3.76E-04	1.48E-02
Cobalt Compounds	1.02E-01	4.37E-05	3.95E-06	1.03E-01
Ethylbenzene	1.08E-03	4.61E-07		1.08E-03
Formaldehyde	1.04E+00	4.42E-04		1.04E+00
Hydrochloric Acid			6.20E-04	6.20E-04
Lead Compounds	2.57E-02	9.14E-06	1.03E-02	3.60E-02
Manganese Compounds	5.11E-02	6.09E-06	1.28E-03	5.23E-02
Mercury Compounds	1.92E-03	3.05E-06		1.93E-03
Nickel Compounds	1.44E+00	3.05E-06	2.07E-04	1.44E+00
Naphthalene	1.92E-02	8.19E-06		1.92E-02
Phosphorus	1.61E-01	6.86E-05		1.61E-01
POM	2.21E-02	9.43E-06		2.21E-02
Selenium Compounds	1.16E-02	1.52E-05		1.16E-02
Toluene	1.06E-01	4.50E-05		1.06E-01
Xylene				
o-Xylene	1.86E-03	7.90E-07		1.86E-03
Total HAPs				3.13E+00

Kahe 4 No 6 FO

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	28,686,472	150,273	4,310,802	0.391	M	842.8
NOX	28,686,472	150,273	4,310,802	0.313	A	674.6
CO	28,686,472	150,273	4,310,802	0.0333	A	71.8
VOC	28,686,472	150,273	4,310,802	0.00507	A	10.9
PM-PRI	28,686,472	150,273	4,310,802	0.0541	A	116.6
PM-FIL	28,686,472	150,273	4,310,802	0.0441	A	95.1
PM-CON	28,686,472	150,273	4,310,802	0.0100	A	21.6
PM10-PRI	28,686,472	150,273	4,310,802	0.0413	A	89.0
PM10-FIL	28,686,472	150,273	4,310,802	0.0313	A	67.5
PM25-PRI	28,686,472	150,273	4,310,802	0.0329	A	70.9
PM25-FIL	28,686,472	150,273	4,310,802	0.0229	A	49.4
Acetaldehyde	28,686,472	150,273	4,310,802		A	
Acrolein	28,686,472	150,273	4,310,802		A	
Antimony Compounds	28,686,472	150,273	4,310,802	3.50E-05	A	7.54E-02
Arsenic Compounds	28,686,472	150,273	4,310,802	8.80E-06	A	1.90E-02
Benzene	28,686,472	150,273	4,310,802	1.43E-06	A	3.08E-03
Beryllium Compounds	28,686,472	150,273	4,310,802	1.85E-07	A	3.99E-04
1,3-Butadiene	28,686,472	150,273	4,310,802		A	
Cadmium Compounds	28,686,472	150,273	4,310,802	2.65E-06	A	5.72E-03
Chromium Compounds	28,686,472	150,273	4,310,802	5.63E-06	A	1.21E-02
Cobalt Compounds	28,686,472	150,273	4,310,802	4.01E-05	A	8.65E-02
Ethylbenzene	28,686,472	150,273	4,310,802	4.24E-07	A	9.14E-04
Formaldehyde	28,686,472	150,273	4,310,802	4.07E-04	A	8.77E-01
Hydrochloric Acid	28,686,472	150,273	4,310,802		A	
Lead Compounds	28,686,472	150,273	4,310,802	1.01E-05	A	2.17E-02
Manganese Compounds	28,686,472	150,273	4,310,802	2.00E-05	A	4.31E-02
Mercury Compounds	28,686,472	150,273	4,310,802	7.53E-07	A	1.62E-03
Nickel Compounds	28,686,472	150,273	4,310,802	5.63E-04	A	1.21E+00
Naphthalene	28,686,472	150,273	4,310,802	7.53E-06	A	1.62E-02
Phosphorus	28,686,472	150,273	4,310,802	6.31E-05	A	1.36E-01
POM	28,686,472	150,273	4,310,802	8.67E-06	A	1.87E-02
Selenium Compounds	28,686,472	150,273	4,310,802	4.55E-06	A	9.81E-03
Toluene	28,686,472	150,273	4,310,802	4.13E-05	A	8.91E-02
Xylene	28,686,472	150,273	4,310,802		A	
o-Xylene	28,686,472	150,273	4,310,802	7.27E-07	A	1.57E-03

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Kahe 4 No 2 FO

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	11,304	140,000	1,583	0.015	M	0.012
NOX	11,304	140,000	1,583	0.171	A	0.135
CO	11,304	140,000	1,583	0.0357	A	0.028
VOC	11,304	140,000	1,583	0.00143	A	0.001
PM-PRI	11,304	140,000	1,583	0.0236	A	0.019
PM-FIL	11,304	140,000	1,583	0.0143	A	0.011
PM-CON	11,304	140,000	1,583	0.00929	A	0.007
PM10-PRI	11,304	140,000	1,583	0.0164	A	0.013
PM10-FIL	11,304	140,000	1,583	0.00714	A	0.006
PM25-PRI	11,304	140,000	1,583	0.0111	A	0.009
PM25-FIL	11,304	140,000	1,583	0.00179	A	0.001
Acetaldehyde	11,304	140,000	1,583		A	
Acrolein	11,304	140,000	1,583		A	
Antimony Compounds	11,304	140,000	1,583	3.75E-05	A	2.97E-05
Arsenic Compounds	11,304	140,000	1,583	4.00E-06	A	3.17E-06
Benzene	11,304	140,000	1,583	1.53E-06	A	1.21E-06
Beryllium Compounds	11,304	140,000	1,583	3.00E-06	A	2.37E-06
1,3-Butadiene	11,304	140,000	1,583		A	
Cadmium Compounds	11,304	140,000	1,583	3.00E-06	A	2.37E-06
Chromium Compounds	11,304	140,000	1,583	3.00E-06	A	2.37E-06
Cobalt Compounds	11,304	140,000	1,583	4.30E-05	A	3.40E-05
Ethylbenzene	11,304	140,000	1,583	4.54E-07	A	3.59E-07
Formaldehyde	11,304	140,000	1,583	4.36E-04	A	3.45E-04
Hydrochloric Acid	11,304	140,000	1,583		A	
Lead Compounds	11,304	140,000	1,583	9.00E-06	A	7.12E-06
Manganese Compounds	11,304	140,000	1,583	6.00E-06	A	4.75E-06
Mercury Compounds	11,304	140,000	1,583	3.00E-06	A	2.37E-06
Nickel Compounds	11,304	140,000	1,583	3.00E-06	A	2.37E-06
Naphthalene	11,304	140,000	1,583	8.07E-06	A	6.39E-06
Phosphorus	11,304	140,000	1,583	6.76E-05	A	5.35E-05
POM	11,304	140,000	1,583	9.29E-06	A	7.35E-06
Selenium Compounds	11,304	140,000	1,583	1.50E-05	A	1.19E-05
Toluene	11,304	140,000	1,583	4.43E-05	A	3.50E-05
Xylene	11,304	140,000	1,583		A	
o-Xylene	11,304	140,000	1,583	7.79E-07	A	6.16E-07

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Kahe 4 Spec Used Oil

Pollutant	Annual Fuel Use (gal/yr)	Emission Factor (lb/10^3 gal)	EF Ref	Annual Emissions (tons/yr)
SO2	0	10.3	A	
NOX	0	47	A	
CO	0	5	A	
VOC	0	0.76	A	
PM-PRI	0	5.36	A	
PM-FIL	0	3.86	A	
PM-CON	0	1.5	A	
PM10-PRI	0	4.24	A	
PM10-FIL	0	2.74	A	
PM25-PRI	0	3.51	A	
PM25-FIL	0	2.01	A	
Acetaldehyde	0		A	
Acrolein	0		A	
Antimony Compounds	0		A	
Arsenic Compounds	0	1.10E-01	A	
Benzene	0		A	
Beryllium Compounds	0		A	
1,3-Butadiene	0		A	
Cadmium Compounds	0	9.30E-03	A	
Chromium Compounds	0	2.00E-02	A	
Cobalt Compounds	0	2.10E-04	A	
Ethylbenzene	0		A	
Formaldehyde	0		A	
Hydrochloric Acid	0	3.30E-02	A	
Lead Compounds	*0*	*5.50E-01*	A	
Manganese Compounds	0	6.80E-02	A	
Mercury Compounds	0		A	
Nickel Compounds	0	1.10E-02	A	
Naphthalene	0		A	
Phosphorus	0		A	
POM	0		A	
Selenium Compounds	0		A	
Toluene	0		A	
Xylene	0		A	
o-Xylene	0		A	

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Kahe 4 Total

	Annual Emissions			
Pollutant	No 6 Fuel Oil (tons/yr)	No 2 Fuel Oil (tons/yr)	Spec Used Oil (tons/yr)	Total (tons/yr)
SO2	842.8	0.012		842.8
NOX	674.6	0.135		674.7
CO	71.8	0.028		71.8
VOC	10.9	0.001		10.9
PM-PRI	116.6	0.019		116.6
PM-FIL	95.1	0.011		95.1
PM-CON	21.6	0.007		21.6
PM10-PRI	89	0.013		89
PM10-FIL	67.5	0.006		67.5
PM25-PRI	70.9	0.009		70.9
PM25-FIL	49.4	0.001		49.4
Acetaldehyde				
Acrolein				
Antimony Compounds	7.54E-02	2.97E-05		7.55E-02
Arsenic Compounds	1.90E-02	3.17E-06		1.90E-02
Benzene	3.08E-03	1.21E-06		3.08E-03
Beryllium Compounds	3.99E-04	2.37E-06		4.02E-04
1,3-Butadiene				
Cadmium Compounds	5.72E-03	2.37E-06		5.72E-03
Chromium Compounds	1.21E-02	2.37E-06		1.21E-02
Cobalt Compounds	8.65E-02	3.40E-05		8.65E-02
Ethylbenzene	9.14E-04	3.59E-07		9.14E-04
Formaldehyde	8.77E-01	3.45E-04		8.77E-01
Hydrochloric Acid				
Lead Compounds	2.17E-02	7.12E-06		2.17E-02
Manganese Compounds	4.31E-02	4.75E-06		4.31E-02
Mercury Compounds	1.62E-03	2.37E-06		1.63E-03
Nickel Compounds	1.21E+00	2.37E-06		1.21E+00
Naphthalene	1.62E-02	6.39E-06		1.62E-02
Phosphorus	1.36E-01	5.35E-05		1.36E-01
POM	1.87E-02	7.35E-06		1.87E-02
Selenium Compounds	9.81E-03	1.19E-05		9.83E-03
Toluene	8.91E-02	3.50E-05		8.91E-02
Xylene				
o-Xylene	1.57E-03	6.16E-07		1.57E-03
Total HAPs				2.63E+00

Kahe 5 No 6 FO

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	51,608,715	150,273	7,755,396	0.391	M	1516.2
NOX	51,608,715	150,273	7,755,396	0.313	A	1213.7
CO	51,608,715	150,273	7,755,396	0.0333	A	129.1
VOC	51,608,715	150,273	7,755,396	0.00507	A	19.7
PM-PRI	51,608,715	150,273	7,755,396	0.0541	A	209.8
PM-FIL	51,608,715	150,273	7,755,396	0.0441	A	171.0
PM-CON	51,608,715	150,273	7,755,396	0.0100	A	38.8
PM10-PRI	51,608,715	150,273	7,755,396	0.0413	A	160.1
PM10-FIL	51,608,715	150,273	7,755,396	0.0313	A	121.4
PM25-PRI	51,608,715	150,273	7,755,396	0.0329	A	127.6
PM25-FIL	51,608,715	150,273	7,755,396	0.0229	A	88.8
Acetaldehyde	51,608,715	150,273	7,755,396		A	
Acrolein	51,608,715	150,273	7,755,396		A	
Antimony Compounds	51,608,715	150,273	7,755,396	3.50E-05	A	1.36E-01
Arsenic Compounds	51,608,715	150,273	7,755,396	8.80E-06	A	3.41E-02
Benzene	51,608,715	150,273	7,755,396	1.43E-06	A	5.53E-03
Beryllium Compounds	51,608,715	150,273	7,755,396	1.85E-07	A	7.19E-04
1,3-Butadiene	51,608,715	150,273	7,755,396		A	
Cadmium Compounds	51,608,715	150,273	7,755,396	2.65E-06	A	1.03E-02
Chromium Compounds	51,608,715	150,273	7,755,396	5.63E-06	A	2.18E-02
Cobalt Compounds	51,608,715	150,273	7,755,396	4.01E-05	A	1.56E-01
Ethylbenzene	51,608,715	150,273	7,755,396	4.24E-07	A	1.64E-03
Formaldehyde	51,608,715	150,273	7,755,396	4.07E-04	A	1.58E+00
Hydrochloric Acid	51,608,715	150,273	7,755,396		A	
Lead Compounds	51,608,715	150,273	7,755,396	1.01E-05	A	3.90E-02
Manganese Compounds	51,608,715	150,273	7,755,396	2.00E-05	A	7.76E-02
Mercury Compounds	51,608,715	150,273	7,755,396	7.53E-07	A	2.92E-03
Nickel Compounds	51,608,715	150,273	7,755,396	5.63E-04	A	2.18E+00
Naphthalene	51,608,715	150,273	7,755,396	7.53E-06	A	2.92E-02
Phosphorus	51,608,715	150,273	7,755,396	6.31E-05	A	2.45E-01
POM	51,608,715	150,273	7,755,396	8.67E-06	A	3.36E-02
Selenium Compounds	51,608,715	150,273	7,755,396	4.55E-06	A	1.77E-02
Toluene	51,608,715	150,273	7,755,396	4.13E-05	A	1.60E-01
Xylene	51,608,715	150,273	7,755,396		A	
o-Xylene	51,608,715	150,273	7,755,396	7.27E-07	A	2.82E-03

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Kahe 5 No 2 FO

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	20,282	140,000	2,839	0.015	M	0.021
NOX	20,282	140,000	2,839	0.171	A	0.243
CO	20,282	140,000	2,839	0.0357	A	0.051
VOC	20,282	140,000	2,839	0.00143	A	0.002
PM-PRI	20,282	140,000	2,839	0.0236	A	0.034
PM-FIL	20,282	140,000	2,839	0.0143	A	0.020
PM-CON	20,282	140,000	2,839	0.00929	A	0.013
PM10-PRI	20,282	140,000	2,839	0.0164	A	0.023
PM10-FIL	20,282	140,000	2,839	0.00714	A	0.010
PM25-PRI	20,282	140,000	2,839	0.0111	A	0.016
PM25-FIL	20,282	140,000	2,839	0.00179	A	0.003
Acetaldehyde	20,282	140,000	2,839		A	
Acrolein	20,282	140,000	2,839		A	
Antimony Compounds	20,282	140,000	2,839	3.75E-05	A	5.32E-05
Arsenic Compounds	20,282	140,000	2,839	4.00E-06	A	5.68E-06
Benzene	20,282	140,000	2,839	1.53E-06	A	2.17E-06
Beryllium Compounds	20,282	140,000	2,839	3.00E-06	A	4.26E-06
1,3-Butadiene	20,282	140,000	2,839		A	
Cadmium Compounds	20,282	140,000	2,839	3.00E-06	A	4.26E-06
Chromium Compounds	20,282	140,000	2,839	3.00E-06	A	4.26E-06
Cobalt Compounds	20,282	140,000	2,839	4.30E-05	A	6.10E-05
Ethylbenzene	20,282	140,000	2,839	4.54E-07	A	6.45E-07
Formaldehyde	20,282	140,000	2,839	4.36E-04	A	6.19E-04
Hydrochloric Acid	20,282	140,000	2,839		A	
Lead Compounds	20,282	140,000	2,839	9.00E-06	A	1.28E-05
Manganese Compounds	20,282	140,000	2,839	6.00E-06	A	8.52E-06
Mercury Compounds	20,282	140,000	2,839	3.00E-06	A	4.26E-06
Nickel Compounds	20,282	140,000	2,839	3.00E-06	A	4.26E-06
Naphthalene	20,282	140,000	2,839	8.07E-06	A	1.15E-05
Phosphorus	20,282	140,000	2,839	6.76E-05	A	9.59E-05
POM	20,282	140,000	2,839	9.29E-06	A	1.32E-05
Selenium Compounds	20,282	140,000	2,839	1.50E-05	A	2.13E-05
Toluene	20,282	140,000	2,839	4.43E-05	A	6.29E-05
Xylene	20,282	140,000	2,839		A	
o-Xylene	20,282	140,000	2,839	7.79E-07	A	1.11E-06

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Kahe 5 Total

	Annual Emissions		
Pollutant	No 6 Fuel Oil (tons/yr)	No 2 Fuel Oil (tons/yr)	Total (tons/yr)
SO2	1516.2	0.021	1516.2
NOX	1213.7	0.243	1213.9
CO	129.1	0.051	129.2
VOC	19.7	0.002	19.7
PM-PRI	209.8	0.034	209.8
PM-FIL	171	0.020	171
PM-CON	38.8	0.013	38.8
PM10-PRI	160.1	0.023	160.1
PM10-FIL	121.4	0.010	121.4
PM25-PRI	127.6	0.016	127.6
PM25-FIL	88.8	0.003	88.8
Acetaldehyde			
Acrolein			
Antimony Compounds	1.36E-01	5.32E-05	1.36E-01
Arsenic Compounds	3.41E-02	5.68E-06	3.41E-02
Benzene	5.53E-03	2.17E-06	5.53E-03
Beryllium Compounds	7.19E-04	4.26E-06	7.23E-04
1,3-Butadiene			
Cadmium Compounds	1.03E-02	4.26E-06	1.03E-02
Chromium Compounds	2.18E-02	4.26E-06	2.18E-02
Cobalt Compounds	1.56E-01	6.10E-05	1.56E-01
Ethylbenzene	1.64E-03	6.45E-07	1.64E-03
Formaldehyde	1.58E+00	6.19E-04	1.58E+00
Hydrochloric Acid			
Lead Compounds	3.90E-02	1.28E-05	3.90E-02
Manganese Compounds	7.76E-02	8.52E-06	7.76E-02
Mercury Compounds	2.92E-03	4.26E-06	2.93E-03
Nickel Compounds	2.18E+00	4.26E-06	2.18E+00
Naphthalene	2.92E-02	1.15E-05	2.92E-02
Phosphorus	2.45E-01	9.59E-05	2.45E-01
POM	3.36E-02	1.32E-05	3.36E-02
Selenium Compounds	1.77E-02	2.13E-05	1.77E-02
Toluene	1.60E-01	6.29E-05	1.60E-01
Xylene			
o-Xylene	2.82E-03	1.11E-06	2.82E-03
Total HAPs			4.74E+00

Kahe 6 No 6 FO

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	57,850,103	150,273	8,693,309	0.391	M	1699.5
NOX	57,850,103	150,273	8,693,309	0.197	S	856.3
CO	57,850,103	150,273	8,693,309	0.0333	A	144.7
VOC	57,850,103	150,273	8,693,309	0.00507	A	22.0
PM-PRI	57,850,103	150,273	8,693,309	0.0440	S	191.3
PM-FIL	57,850,103	150,273	8,693,309	0.0400	S	173.9
PM-CON	57,850,103	150,273	8,693,309	0.0040	S	17.4
PM10-PRI	57,850,103	150,273	8,693,309	0.0320	S	139.1
PM10-FIL	57,850,103	150,273	8,693,309	0.0284	S	123.4
PM25-PRI	57,850,103	150,273	8,693,309	0.0250	S	108.7
PM25-FIL	57,850,103	150,273	8,693,309	0.0208	S	90.4
Acetaldehyde	57,850,103	150,273	8,693,309		A	
Acrolein	57,850,103	150,273	8,693,309		A	
Antimony Compounds	57,850,103	150,273	8,693,309	3.50E-05	A	1.52E-01
Arsenic Compounds	57,850,103	150,273	8,693,309	8.80E-06	A	3.83E-02
Benzene	57,850,103	150,273	8,693,309	1.43E-06	A	6.20E-03
Beryllium Compounds	57,850,103	150,273	8,693,309	1.85E-07	A	8.06E-04
1,3-Butadiene	57,850,103	150,273	8,693,309		A	
Cadmium Compounds	57,850,103	150,273	8,693,309	2.65E-06	A	1.15E-02
Chromium Compounds	57,850,103	150,273	8,693,309	5.63E-06	A	2.45E-02
Cobalt Compounds	57,850,103	150,273	8,693,309	4.01E-05	A	1.74E-01
Ethylbenzene	57,850,103	150,273	8,693,309	4.24E-07	A	1.84E-03
Formaldehyde	57,850,103	150,273	8,693,309	4.07E-04	A	1.77E+00
Hydrochloric Acid	57,850,103	150,273	8,693,309		A	
Lead Compounds	57,850,103	150,273	8,693,309	1.01E-05	A	4.38E-02
Manganese Compounds	57,850,103	150,273	8,693,309	2.00E-05	A	8.69E-02
Mercury Compounds	57,850,103	150,273	8,693,309	7.53E-07	A	3.27E-03
Nickel Compounds	57,850,103	150,273	8,693,309	5.63E-04	A	2.45E+00
Naphthalene	57,850,103	150,273	8,693,309	7.53E-06	A	3.27E-02
Phosphorus	57,850,103	150,273	8,693,309	6.31E-05	A	2.74E-01
POM	57,850,103	150,273	8,693,309	8.67E-06	A	3.77E-02
Selenium Compounds	57,850,103	150,273	8,693,309	4.55E-06	A	1.98E-02
Toluene	57,850,103	150,273	8,693,309	4.13E-05	A	1.80E-01
Xylene	57,850,103	150,273	8,693,309		A	
o-Xylene	57,850,103	150,273	8,693,309	7.27E-07	A	3.16E-03

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Kahe 6 No 2 FO

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	23,266	140,000	3,257	0.015	M	0.024
NOX	23,266	140,000	3,257	0.197	S	0.321
CO	23,266	140,000	3,257	0.0357	A	0.058
VOC	23,266	140,000	3,257	0.00143	A	0.002
PM-PRI	23,266	140,000	3,257	0.0440	S	0.072
PM-FIL	23,266	140,000	3,257	0.0400	S	0.065
PM-CON	23,266	140,000	3,257	0.0040	S	0.007
PM10-PRI	23,266	140,000	3,257	0.0320	S	0.052
PM10-FIL	23,266	140,000	3,257	0.0284	S	0.046
PM25-PRI	23,266	140,000	3,257	0.0250	S	0.041
PM25-FIL	23,266	140,000	3,257	0.0208	S	0.034
Acetaldehyde	23,266	140,000	3,257		A	
Acrolein	23,266	140,000	3,257		A	
Antimony Compounds	23,266	140,000	3,257	3.75E-05	A	6.11E-05
Arsenic Compounds	23,266	140,000	3,257	4.00E-06	A	6.51E-06
Benzene	23,266	140,000	3,257	1.53E-06	A	2.49E-06
Beryllium Compounds	23,266	140,000	3,257	3.00E-06	A	4.89E-06
1,3-Butadiene	23,266	140,000	3,257		A	
Cadmium Compounds	23,266	140,000	3,257	3.00E-06	A	4.89E-06
Chromium Compounds	23,266	140,000	3,257	3.00E-06	A	4.89E-06
Cobalt Compounds	23,266	140,000	3,257	4.30E-05	A	7.00E-05
Ethylbenzene	23,266	140,000	3,257	4.54E-07	A	7.40E-07
Formaldehyde	23,266	140,000	3,257	4.36E-04	A	7.10E-04
Hydrochloric Acid	23,266	140,000	3,257		A	
Lead Compounds	23,266	140,000	3,257	9.00E-06	A	1.47E-05
Manganese Compounds	23,266	140,000	3,257	6.00E-06	A	9.77E-06
Mercury Compounds	23,266	140,000	3,257	3.00E-06	A	4.89E-06
Nickel Compounds	23,266	140,000	3,257	3.00E-06	A	4.89E-06
Naphthalene	23,266	140,000	3,257	8.07E-06	A	1.31E-05
Phosphorus	23,266	140,000	3,257	6.76E-05	A	1.10E-04
POM	23,266	140,000	3,257	9.29E-06	A	1.51E-05
Selenium Compounds	23,266	140,000	3,257	1.50E-05	A	2.44E-05
Toluene	23,266	140,000	3,257	4.43E-05	A	7.21E-05
Xylene	23,266	140,000	3,257		A	
o-Xylene	23,266	140,000	3,257	7.79E-07	A	1.27E-06

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Kahe 6 Total

	Annual Emissions		
Pollutant	No 6 Fuel Oil (tons/yr)	No 2 Fuel Oil (tons/yr)	Total (tons/yr)
SO2	1699.5	0.024	1699.5
NOX	856.3	0.321	856.6
CO	144.7	0.058	144.8
VOC	22	0.002	22
PM-PRI	191.3	0.072	191.4
PM-FIL	173.9	0.065	174
PM-CON	17.4	0.007	17.4
PM10-PRI	139.1	0.052	139.2
PM10-FIL	123.4	0.046	123.4
PM25-PRI	108.7	0.041	108.7
PM25-FIL	90.4	0.034	90.4
Acetaldehyde			
Acrolein			
Antimony Compounds	1.52E-01	6.11E-05	1.52E-01
Arsenic Compounds	3.83E-02	6.51E-06	3.83E-02
Benzene	6.20E-03	2.49E-06	6.20E-03
Beryllium Compounds	8.06E-04	4.89E-06	8.10E-04
1,3-Butadiene			
Cadmium Compounds	1.15E-02	4.89E-06	1.15E-02
Chromium Compounds	2.45E-02	4.89E-06	2.45E-02
Cobalt Compounds	1.74E-01	7.00E-05	1.75E-01
Ethylbenzene	1.84E-03	7.40E-07	1.84E-03
Formaldehyde	1.77E+00	7.10E-04	1.77E+00
Hydrochloric Acid			
Lead Compounds	4.38E-02	1.47E-05	4.38E-02
Manganese Compounds	8.69E-02	9.77E-06	8.69E-02
Mercury Compounds	3.27E-03	4.89E-06	3.28E-03
Nickel Compounds	2.45E+00	4.89E-06	2.45E+00
Naphthalene	3.27E-02	1.31E-05	3.28E-02
Phosphorus	2.74E-01	1.10E-04	2.74E-01
POM	3.77E-02	1.51E-05	3.77E-02
Selenium Compounds	1.98E-02	2.44E-05	1.98E-02
Toluene	1.80E-01	7.21E-05	1.80E-01
Xylene			
o-Xylene	3.16E-03	1.27E-06	3.16E-03
Total HAPs			5.31E+00

Kahe A

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	16,315	140,000	2,284	0.015	M	0.017
NOX	16,315	140,000	2,284	3.2	A	3.65
CO	16,315	140,000	2,284	0.85	A	0.971
VOC	16,315	140,000	2,284	0.0819	A	0.0935
PM-PRI	16,315	140,000	2,284	0.0697	A	0.0796
PM-FIL	16,315	140,000	2,284	0.0620	A	0.0708
PM-CON	16,315	140,000	2,284	0.0077	A	0.0088
PM10-PRI	16,315	140,000	2,284	0.0573	A	0.0654
PM10-FIL	16,315	140,000	2,284	0.0496	A	0.0566
PM25-PRI	16,315	140,000	2,284	0.0556	A	0.0635
PM25-FIL	16,315	140,000	2,284	0.0479	A	0.0547
Acetaldehyde	16,315	140,000	2,284	2.52E-05	A	2.88E-05
Acrolein	16,315	140,000	2,284	7.88E-06	A	9.00E-06
Antimony Compounds	16,315	140,000	2,284		A	
Arsenic Compounds	16,315	140,000	2,284	1.10E-05	A	1.26E-05
Benzene	16,315	140,000	2,284	7.76E-04	A	8.86E-04
Beryllium Compounds	16,315	140,000	2,284	3.10E-07	A	3.54E-07
1,3-Butadiene	16,315	140,000	2,284	1.60E-05	A	1.83E-05
Cadmium Compounds	16,315	140,000	2,284	4.80E-06	A	5.48E-06
Chromium Compounds	16,315	140,000	2,284	1.10E-05	A	1.26E-05
Cobalt Compounds	16,315	140,000	2,284		A	
Ethylbenzene	16,315	140,000	2,284		A	
Formaldehyde	16,315	140,000	2,284	7.89E-05	A	9.01E-05
Hydrochloric Acid	16,315	140,000	2,284		A	
Lead Compounds	16,315	140,000	2,284	1.40E-05	A	1.60E-05
Manganese Compounds	16,315	140,000	2,284	7.90E-04	A	9.02E-04
Mercury Compounds	16,315	140,000	2,284	1.20E-06	A	1.37E-06
Nickel Compounds	16,315	140,000	2,284	4.60E-06	A	5.25E-06
Naphthalene	16,315	140,000	2,284	1.30E-04	A	1.48E-04
Phosphorus	16,315	140,000	2,284		A	
POM	16,315	140,000	2,284	2.12E-04	A	2.42E-04
Selenium Compounds	16,315	140,000	2,284	2.50E-05	A	2.86E-05
Toluene	16,315	140,000	2,284	2.81E-04	A	3.21E-04
Xylene	16,315	140,000	2,284	1.93E-04	A	2.20E-04
o-Xylene	16,315	140,000	2,284		A	
Total HAPs						2.95E-03

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Kahe B

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	9,688	140,000	1,356	0.015	M	0.010
NOX	9,688	140,000	1,356	3.2	A	2.17
CO	9,688	140,000	1,356	0.85	A	0.576
VOC	9,688	140,000	1,356	0.0819	A	0.0555
PM-PRI	9,688	140,000	1,356	0.0697	A	0.0473
PM-FIL	9,688	140,000	1,356	0.0620	A	0.0420
PM-CON	9,688	140,000	1,356	0.0077	A	0.0052
PM10-PRI	9,688	140,000	1,356	0.0573	A	0.0389
PM10-FIL	9,688	140,000	1,356	0.0496	A	0.0336
PM25-PRI	9,688	140,000	1,356	0.0556	A	0.0377
PM25-FIL	9,688	140,000	1,356	0.0479	A	0.0325
Acetaldehyde	9,688	140,000	1,356	2.52E-05	A	1.71E-05
Acrolein	9,688	140,000	1,356	7.88E-06	A	5.34E-06
Antimony Compounds	9,688	140,000	1,356		A	
Arsenic Compounds	9,688	140,000	1,356	1.10E-05	A	7.46E-06
Benzene	9,688	140,000	1,356	7.76E-04	A	5.26E-04
Beryllium Compounds	9,688	140,000	1,356	3.10E-07	A	2.10E-07
1,3-Butadiene	9,688	140,000	1,356	1.60E-05	A	1.09E-05
Cadmium Compounds	9,688	140,000	1,356	4.80E-06	A	3.26E-06
Chromium Compounds	9,688	140,000	1,356	1.10E-05	A	7.46E-06
Cobalt Compounds	9,688	140,000	1,356		A	
Ethylbenzene	9,688	140,000	1,356		A	
Formaldehyde	9,688	140,000	1,356	7.89E-05	A	5.35E-05
Hydrochloric Acid	9,688	140,000	1,356		A	
Lead Compounds	9,688	140,000	1,356	1.40E-05	A	9.49E-06
Manganese Compounds	9,688	140,000	1,356	7.90E-04	A	5.36E-04
Mercury Compounds	9,688	140,000	1,356	1.20E-06	A	8.14E-07
Nickel Compounds	9,688	140,000	1,356	4.60E-06	A	3.12E-06
Naphthalene	9,688	140,000	1,356	1.30E-04	A	8.82E-05
Phosphorus	9,688	140,000	1,356		A	
POM	9,688	140,000	1,356	2.12E-04	A	1.44E-04
Selenium Compounds	9,688	140,000	1,356	2.50E-05	A	1.70E-05
Toluene	9,688	140,000	1,356	2.81E-04	A	1.91E-04
Xylene	9,688	140,000	1,356	1.93E-04	A	1.31E-04
o-Xylene	9,688	140,000	1,356		A	
Total HAPs						1.75E-03

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Summary

Pollutant	Annual Emissions (tons/year)								
	Kahe 1	Kahe 2	Kahe 3	Kahe 4	Kahe 5	Kahe 6	Kahe A	Kahe B	Total
SO2	795.1	926.2	998.4	842.8	1516.2	1699.5	0.0	0.0	6,778.2
NOX	637.0	741.6	800.2	674.7	1213.9	856.6	3.7	2.2	4,929.9
CO	67.8	78.9	85.1	71.8	129.2	144.8	1.0	0.6	579.2
VOC	10.3	12.0	12.9	10.9	19.7	22.0	0.1	0.1	88.0
PM-PRI	110.1	128.2	138.2	116.6	209.8	191.4	0.1	0.0	894.4
PM-FIL	89.8	104.5	112.7	95.1	171.0	174.0	0.1	0.0	747.2
PM-CON	20.3	23.7	25.5	21.6	38.8	17.4	0.0	0.0	147.3
PM10-PRI	84.1	97.8	105.5	89.0	160.1	139.2	0.1	0.0	675.8
PM10-FIL	63.6	74.1	80.0	67.5	121.4	123.4	0.1	0.0	530.1
PM25-PRI	67.0	77.9	80.5	70.9	127.6	108.7	0.1	0.0	532.7
PM25-FIL	46.6	54.2	54.9	49.4	88.8	90.4	0.1	0.0	384.4
Acetaldehyde	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Acrolein	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Antimony Compounds	0.0712	0.0829	0.0894	0.0755	0.1358	0.1522	0.0000	0.0000	
Arsenic Compounds	0.0196	0.0209	0.0245	0.0190	0.0341	0.0383	0.0000	0.0000	
Benzene	0.0029	0.0034	0.0036	0.0031	0.0055	0.0062	0.0009	0.0005	
Beryllium Compounds	0.0004	0.0004	0.0005	0.0004	0.0007	0.0008	0.0000	0.0000	
1,3-Butadiene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Cadmium Compounds	0.0055	0.0063	0.0070	0.0057	0.0103	0.0115	0.0000	0.0000	
Chromium Compounds	0.0118	0.0134	0.0148	0.0121	0.0218	0.0245	0.0000	0.0000	
Cobalt Compounds	0.0816	0.0951	0.1025	0.0865	0.1557	0.1745	0.0000	0.0000	
Ethylbenzene	0.0009	0.0010	0.0011	0.0009	0.0016	0.0018	0.0000	0.0000	
Formaldehyde	0.8268	0.9634	1.0387	0.8769	1.5775	1.7683	0.0001	0.0001	
Hydrochloric Acid	0.0005	0.0000	0.0006	0.0000	0.0000	0.0000	0.0000	0.0000	
Lead Compounds	0.0290	0.0243	0.0360	0.0217	0.0390	0.0438	0.0000	0.0000	
Manganese Compounds	0.0417	0.0474	0.0523	0.0431	0.0776	0.0869	0.0009	0.0005	
Mercury Compounds	0.0015	0.0018	0.0019	0.0016	0.0029	0.0033	0.0000	0.0000	
Nickel Compounds	1.1454	1.3345	1.4384	1.2142	2.1844	2.4486	0.0000	0.0000	
Naphthalene	0.0153	0.0178	0.0192	0.0162	0.0292	0.0328	0.0001	0.0001	
Phosphorus	0.1282	0.1494	0.1611	0.1360	0.2446	0.2742	0.0000	0.0000	
POM	0.0176	0.0205	0.0221	0.0187	0.0336	0.0377	0.0002	0.0001	
Selenium Compounds	0.0093	0.0108	0.0116	0.0098	0.0177	0.0198	0.0000	0.0000	
Toluene	0.0840	0.0979	0.1056	0.0891	0.1603	0.1797	0.0003	0.0002	
Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0001	
o-Xylene	0.0015	0.0017	0.0019	0.0016	0.0028	0.0032	0.0000	0.0000	
Total HAPS	2.5	2.9	3.1	2.6	4.7	5.3	0.0	0.0	

HECO/C

Electronic distribution:

bc (w/enc):	G. Murata
	B. Nakamoto
	B. Schlieman
	J. Clary (JCA)
	Environmental Department File
bc (w/o enc):	D. Giovanni

Hawaiian Electric Company, Inc. • PO Box 2750 • Honolulu, HI 96840-0001

Waiau

April 27, 2007

Sherri-Ann Loo, Esq.
Manager
Environmental Department

Mr. Wilfred K. Nagamine
Manager, Clean Air Branch
Hawaii State Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

Subject: 2006 Hawaii Emissions Inventory Reports and Annual Fee Payment
Waiau Generating Station
Covered Source Permit (CSP) No. 0239-01-C
Hawaiian Electric Company, Inc. (HECO)

Dear Mr. Nagamine:

In accordance with the above referenced CSP, enclosed are the 2006 Hawaii Emissions Inventory Reports for the subject facility. On February 27, 2007, the Department of Health granted written approval for an Extension of the Annual Fee Payment and Emission Summary Submittals.

In addition to the 2006 Hawaii Emissions Inventory Reports are the following:

- Form F-1, 2007 Annual Fee Summary for Covered Sources
- Form F-2 Supplement A, 2007 Annual Fee Summary for Covered Sources
- Check No. 71281, made to the order of, HI State-Dept of Health-CAB, Clean Air Special Fund – COV, in the amount of $245,559.35.
- Check No. 71285, made to the order of, HI State-Dept of Health-CAB, Clean Air Special Fund – NON, in the amount of $59,840.75.

If you have any question, please call Ms. Queenie Komori at 543-4526.

Sincerely,

Enclosures
c (w/o encl): T. Simmons

S2020

HAWAIIAN ELECTRIC COMPANY, INC.

DATE	CHECK NO.
04/24/07	71281
HECO	006201

The attached Check is in Payment of the following invoice(s):

Date	Invoice/Credit Memo	Type	Description	Gross	Discount	Net
04/12/07	04122007 2007 ANNUAL FEE, WPP, CSP NO. 0239-01-C			245559.35		245559.35
			TOTAL	245559.35	0.00	245559.35

REMOVE DOCUMENT ALONG THIS PERFORATION

HAWAIIAN ELECTRIC COMPANY, INC.

Bank of Hawaii
Honolulu, Hawaii

59-102
1213

CHECK NO. 71281

PAY TWO HUNDRED FORTY FIVE THOUSAND FIVE HUNDRED FIFTY NINE DOLLARS AND 35 CENTS

TO THE ORDER OF

DATE 04/24/07

CHECK AMOUNT *******245,559.35

HI STATE-DEPT. OF HEALTH-CAB
CLEAN AIR SPECIAL FUND - COV
P.O. BOX 3378
HONOLULU HI 96801

⑈071281⑈ ⑆121301028⑆ 0081⑈032688⑈

SEE REVERSE SIDE FOR OPENING INSTRUCTIONS

Hawaiian Electric Company, Inc.
PO BOX 2750 HONOLULU, HI 96840-0001
KS3-AD

HI STATE-DEPT. OF HEALTH-CAB
CLEAN AIR SPECIAL FUND - COV
P.O. BOX 3378
HONOLULU HI 96801

71281

G2020

HAWAIIAN ELECTRIC COMPANY, INC.

DATE	CHECK NO.
04/24/07	71285
HECO	006202

The attached Check is in Payment of the following Invoice(s):

Date	Invoice/Credit Memo	Type	Description	Gross	Discount	Net
04/12/07	04122007B 2007 ANNUAL PMT, WPP, CSP		NO. 0239-01-C	59840.75		59840.75
			TOTAL	59840.75	0.00	59840.75

REMOVE DOCUMENT ALONG THIS PERFORATION

HAWAIIAN ELECTRIC COMPANY, INC.

Bank of Hawaii
Honolulu, Hawaii
59-102 / 1213

CHECK NO. 71285

PAY FIFTY NINE THOUSAND EIGHT HUNDRED FORTY DOLLARS AND 75 CENTS

TO THE ORDER OF	DATE	CHECK AMOUNT
HI STATE-DEPT OF HEALTH-CAB CLEAN AIR SPECIAL FUND - NON P.O. BOX 3378 HONOLULU HI 96801	04/24/07	********59,840.75

⑈071285⑈ ⑆121301028⑆ 0081⑈032688⑈

SEE REVERSE SIDE FOR OPENING INSTRUCTIONS

Hawaiian Electric Company, Inc.
PO BOX 2750 HONOLULU, HI 96840-0001
KS3-AD

HI STATE-DEPT OF HEALTH-CAB
CLEAN AIR SPECIAL FUND - NON
P.O. BOX 3378
HONOLULU HI 96801

71285

2006 HAWAII EMISSIONS INVENTORY REPORT
FACILITY GENERAL INFORMATION FORM

FIPS State-County-Facility ID: 1500300502

DATA REPRESENTATIVE OF JANUARY 1, 2006 - DECEMBER 31, 2006
(Form instructions are located on the Facility General Information Form Instructions)

1) Facility Name: HECO - Waiau Power Plant

2) Permit No(s).: 0239-01-C

3) Physical Facility Address:

Street: 475 Kamehameha Hwy.

City: Pearl City Zip Code: 96782

4) Emissions Inventory Contact Person Information:

Contact Name:	Phone # + ext:	Fax #	Internet (E-mail) Address:
Queenie Komori	(808) 543-4526	(808) 543-4511	q.komori@heco.com
Mailing Address:	**Mailing City:**	**State:**	**Zip Code:**
P.O. Box 2750	Honolulu	HI	96840

5) Identify CERR source type (CERR thresholds found on the first page of the General Instructions):
(select one) Type A: _____ Type B: X Neither: _____

6) SIC Code (Primary / Secondary): 4911 / _____ 7) NAICS Code: 221112

8) Principal Product: Electrical Generation

9) Facility UTM coordinates (m): Horizontal (x): 607337 (Easting (m)) Vertical (y): 2356837 (Northing (m))

Zone: 4 (Zone 4 or 5) Datum: Old Hawaiian (e.g., NAD 83, NAD 27, or Old Hawaiian)

10) When the 2006 Hawaii Emissions Inventory Report has been completed, please sign and date below.

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record.

Signature: Thomas C. Simmons

Name: Thomas C. Simmons Date: 4/27/07
Responsible Official

Title: VP, Power Supply

FORM F-1

2007 ANNUAL FEE SUMMARY FOR COVERED SOURCES

(FOR AIR POLLUTANTS EMITTED DURING CALENDAR YEAR 2006)

INPUT DATA IN YELLOW COLORED CELLS

Permit No.:	0239-01-C
Date Rec'd:	

1. FACILITY INFORMATION (Signature box to be signed by Responsible Official)

A. Facility Name:	HECO - Waiau Power Plant	B. Location:	475 Kamehameha Hwy.	C. Island:	Oahu
D. Mailing Address:	P.O. Box 2750	E. City:	Honolulu F. State: HI	G. Zip Code:	96840
H. Contact Person:	Queenie Komori	I. Title:	Senior Environmental Scientist	J. Telephone No.:	(808) 543-4526
K. Responsible Official:	Thomas C. Simmons	L. Title:	VP, Power Supply	M. Telephone No.	(808) 543-4301
N. Signature:	Thomas C. Simmons	Date:	4/27/07		

Based on the information and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete

2. CALCULATED EMISSIONS [Report emissions to the nearest tenth of a ton (Line 2.B.) and total annual emis. (Line 2.C.) subject to fees without the fraction(s) of a ton]

Equipment: Unit No. or Activity No.	Air Pollutant Emissions (tons/yr)												
	Other Regulated Air Pollutants including Hazardous Air Pollutants (please specify)												Annual Total
	TSP	PM_{10}	$PM_{2.5}$	SO_2	CO	NOx	VOC	Pb	HAPs	NH_3			
3	24.5	18.7	14.9	174.5	15.3	143.4	2.3	0.0	0.6	--			
4	21.8	16.7	13.3	155.1	13.6	127.4	2.1	0.0	0.5	--			
5	45.4	34.7	27.7	323.3	28.3	265.6	4.3	0.0	1.0	--			
6	37.4	28.6	22.8	266.1	23.3	218.6	3.5	0.0	0.9	--			
A. Supplement (if appl.) A	254.1	194.7	155.5	1805.3	157.4	1640.2	24.0	0.0	6.0	--			
B. Total Report Emissions	383.2	293.4	234.2	2724.3	237.9	2395.2	36.2	0.0	9.0	--			
C. Total Emissions Subject to Fees	383			2,724		2,395	36					D.	5,538

3 ANNUAL FEE CALCULATION (Use the total annual emissions subject to fees calculated in Block 2.D.)

		Total Annual Emissions Subject to Fees (enter 2.D. value below)		Multiply	2006 $/TON	Multiply	CPI Index Adjustmn (3.6% incr. '04 to '05)	Equal		Total
Fee payable to:	"Clean Air Special Fund - COV'	A.	5,538	x	42.80	x	1.036	=	B.	$245,559.35
	"Clean Air Special Fund - NON'	C.	5,538	x	10.43	x	1.036	=	D.	$59,840.75
							Total	=	E.	$305,400.10

Note: 2007 $/ton charge payable to Clean Air Special Fund - COV = $42.80 x 1.036 = $44.34/ton.
2007 $/ton charge payable to Clean Air Special Fund - NON = $10.43 x 1.036 = $10.81/ton.
If the summed amount found in 3.E is less than $500, then pay the minimum amount of $500, with a check made payable to the 'Clean Air Special Fund - COV.'
If the summed amount found in 3.E is greater than $500, then pay the fee amounts found in 3.B & 3.D with two separate checks made payable to the 'Clean Air Special Fund - COV' & 'Clean Air Special Fund - NON,' respectively.

Permit No.:	0239-01-C
Date Rec'd:	

FORM F-2
SUPPLEMENT A
2007 ANNUAL FEE SUMMARY FOR COVERED SOURCES
(FOR AIR POLLUTANTS EMITTED DURING CALENDAR YEAR 2006)

INPUT DATA IN YELLOW COLORED CELLS

1. FACILITY INFORMATION (Signature box to be signed by Responsible Official)

A. Facility Name: HECO - Waiau Power Plant	B. Location: 475 Kamehameha Hwy.	C. Island: Oahu
D. Responsible Official: Thomas C. Simmons	E. Title: VP, Power Supply	F. Telephone No.: (808) 543-4526
G. Signature: Thomas C. Simmons	Date: 4/27/07	
Based on the information and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete		

2. CALCULATED EMISSIONS (Report emissions to the nearest tenth of a ton)

Equipment: Unit No. or Activity No.	Air Pollutant Emissions (tons/yr)												
	Other Regulated Air Pollutants Including Hazardous Air Pollutants (please specify)												
	TSP	PM_{10}	$PM_{2.5}$	SO_2	CO	NOx	VOC	Pb	HAPs	NH_3			
7	128.8	98.5	78.5	917.2	80.2	753.6	12.2	0.0	2.9	--			
8	123.0	94.0	74.9	875.9	76.6	719.7	11.7	0.0	2.8	--			
9	1.5	1.4	1.4	7.9	0.4	107.9	0.1	0.0	0.2	--			
10	0.8	0.8	0.7	4.3	0.2	59.0	0.0	0.0	0.1	--			
Supplement													
Total Report Emissions	254.1	194.7	155.5	1805.3	157.4	1640.2	24.0	0.0	6.0	--			

Waiau 3 No 6 FO

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	6,107,133	150,000	916,070	0.381	M	174.5
NOX	6,107,133	150,000	916,070	0.313	A	143.4
CO	6,107,133	150,000	916,070	0.0333	A	15.3
VOC	6,107,133	150,000	916,070	0.00507	A	2.3
PM-PRI	6,107,133	150,000	916,070	0.0535	A	24.5
PM-FIL	6,107,133	150,000	916,070	0.0435	A	19.9
PM-CON	6,107,133	150,000	916,070	0.0100	A	4.6
PM10-PRI	6,107,133	150,000	916,070	0.0409	A	18.7
PM10-FIL	6,107,133	150,000	916,070	0.0309	A	14.2
PM25-PRI	6,107,133	150,000	916,070	0.0326	A	14.9
PM25-FIL	6,107,133	150,000	916,070	0.0226	A	10.4
Acetaldehyde	6,107,133	150,000	916,070		A	
Acrolein	6,107,133	150,000	916,070		A	
Antimony Compounds	6,107,133	150,000	916,070	3.50E-05	A	1.60E-02
Arsenic Compounds	6,107,133	150,000	916,070	8.80E-06	A	4.03E-03
Benzene	6,107,133	150,000	916,070	1.43E-06	A	6.53E-04
Beryllium Compounds	6,107,133	150,000	916,070	1.85E-07	A	8.49E-05
1,3-Butadiene	6,107,133	150,000	916,070		A	
Cadmium Compounds	6,107,133	150,000	916,070	2.65E-06	A	1.22E-03
Chromium Compounds	6,107,133	150,000	916,070	5.63E-06	A	2.58E-03
Cobalt Compounds	6,107,133	150,000	916,070	4.01E-05	A	1.84E-02
Ethylbenzene	6,107,133	150,000	916,070	4.24E-07	A	1.94E-04
Formaldehyde	6,107,133	150,000	916,070	4.07E-04	A	1.86E-01
Hydrochloric Acid	6,107,133	150,000	916,070		A	
Lead Compounds	6,107,133	150,000	916,070	1.01E-05	A	4.61E-03
Manganese Compounds	6,107,133	150,000	916,070	2.00E-05	A	9.16E-03
Mercury Compounds	6,107,133	150,000	916,070	7.53E-07	A	3.45E-04
Nickel Compounds	6,107,133	150,000	916,070	5.63E-04	A	2.58E-01
Naphthalene	6,107,133	150,000	916,070	7.53E-06	A	3.45E-03
Phosphorus	6,107,133	150,000	916,070	6.31E-05	A	2.89E-02
POM	6,107,133	150,000	916,070	8.67E-06	A	3.97E-03
Selenium Compounds	6,107,133	150,000	916,070	4.55E-06	A	2.09E-03
Toluene	6,107,133	150,000	916,070	4.13E-05	A	1.89E-02
Xylene	6,107,133	150,000	916,070		A	
o-Xylene	6,107,133	150,000	916,070	7.27E-07	A	3.33E-04

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Waiau 3 Spec Used Oil

Pollutant	Annual Fuel Use (gal/yr)	Emission Factor (lb/10³ gal)	EF Ref	Annual Emissions (tons/yr)
SO2	0	11.0	A	
NOX	0	47	A	
CO	0	5	A	
VOC	0	0.76	A	
PM-PRI	0	5.36	A	
PM-FIL	0	3.86	A	
PM-CON	0	1.5	A	
PM10-PRI	0	4.24	A	
PM10-FIL	0	2.74	A	
PM25-PRI	0	3.51	A	
PM25-FIL	0	2.01	A	
Acetaldehyde	0		A	
Acrolein	0		A	
Antimony Compounds	0		A	
Arsenic Compounds	0	1.10E-01	A	
Benzene	0		A	
Beryllium Compounds	0		A	
1,3-Butadiene	0		A	
Cadmium Compounds	0	9.30E-03	A	
Chromium Compounds	0	2.00E-02	A	
Cobalt Compounds	0	2.10E-04	A	
Ethylbenzene	0		A	
Formaldehyde	0		A	
Hydrochloric Acid	0	3.30E-02	A	
Lead Compounds	0	5.50E-01	A	
Manganese Compounds	0	6.80E-02	A	
Mercury Compounds	0		A	
Nickel Compounds	0	1.10E-02	A	
Naphthalene	0		A	
Phosphorus	0		A	
POM	0		A	
Selenium Compounds	0		A	
Toluene	0		A	
Xylene	0		A	
o-Xylene	0		A	

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Waiau 3 Propane

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	2,080	91,500	190	0.00371	M	0.00035
NOX	2,080	91,500	190	0.208	A	0.01979
CO	2,080	91,500	190	0.0350	A	0.00333
VOC	2,080	91,500	190	0.00546	A	0.00052
PM-PRI	2,080	91,500	190	0.0122	A	0.00116
PM-FIL	2,080	91,500	190	0.00656	A	0.00062
PM-CON	2,080	91,500	190	0.00559	A	0.00053
PM10-PRI	2,080	91,500	190	0.0122	A	0.00116
PM10-FIL	2,080	91,500	190	0.00656	A	0.00062
PM25-PRI	2,080	91,500	190	0.0122	A	0.00116
PM25-FIL	2,080	91,500	190	0.00656	A	0.00062
Acetaldehyde	2,080	91,500	190		A	
Acrolein	2,080	91,500	190		A	
Antimony Compounds	2,080	91,500	190		A	
Arsenic Compounds	2,080	91,500	190		A	
Benzene	2,080	91,500	190		A	
Beryllium Compounds	2,080	91,500	190		A	
1,3-Butadiene	2,080	91,500	190		A	
Cadmium Compounds	2,080	91,500	190		A	
Chromium Compounds	2,080	91,500	190		A	
Cobalt Compounds	2,080	91,500	190		A	
Ethylbenzene	2,080	91,500	190		A	
Formaldehyde	2,080	91,500	190		A	
Hydrochloric Acid	2,080	91,500	190		A	
Lead Compounds	2,080	91,500	190		A	
Manganese Compounds	2,080	91,500	190		A	
Mercury Compounds	2,080	91,500	190		A	
Nickel Compounds	2,080	91,500	190		A	
Naphthalene	2,080	91,500	190		A	
Phosphorus	2,080	91,500	190		A	
POM	2,080	91,500	190		A	
Selenium Compounds	2,080	91,500	190		A	
Toluene	2,080	91,500	190		A	
Xylene	2,080	91,500	190		A	
o-Xylene	2,080	91,500	190		A	

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Waiau 3 Total

Pollutant	Annual Emissions Fuel Oil (tons/yr)	Spec Used Oil (tons/yr)	Propane (tons/yr)	Total (tons/yr)
SO2	174.5		0.0004	174.5
NOX	143.4		0.0198	143.4
CO	15.3		0.0033	15.3
VOC	2.3		0.0005	2.3
PM-PRI	24.5		0.0012	24.5
PM-FIL	19.9		0.0006	19.9
PM-CON	4.6		0.0005	4.6
PM10-PRI	18.7		0.0012	18.7
PM10-FIL	14.2		0.0006	14.2
PM25-PRI	14.9		0.0012	14.9
PM25-FIL	10.4		0.0006	10.4
Acetaldehyde				
Acrolein				
Antimony Compounds	1.60E-02			1.60E-02
Arsenic Compounds	4.03E-03			4.03E-03
Benzene	6.53E-04			6.53E-04
Beryllium Compounds	8.49E-05			8.49E-05
1,3-Butadiene				
Cadmium Compounds	1.22E-03			1.22E-03
Chromium Compounds	2.58E-03			2.58E-03
Cobalt Compounds	1.84E-02			1.84E-02
Ethylbenzene	1.94E-04			1.94E-04
Formaldehyde	1.86E-01			1.86E-01
Hydrochloric Acid				
Lead Compounds	4.61E-03			4.61E-03
Manganese Compounds	9.16E-03			9.16E-03
Mercury Compounds	3.45E-04			3.45E-04
Nickel Compounds	2.58E-01			2.58E-01
Naphthalene	3.45E-03			3.45E-03
Phosphorus	2.89E-02			2.89E-02
POM	3.97E-03			3.97E-03
Selenium Compounds	2.09E-03			2.09E-03
Toluene	1.89E-02			1.89E-02
Xylene				
o-Xylene	3.33E-04			3.33E-04
Total HAPs				5.59E-01

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Waiau 4 No 6 FO

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	5,428,140	150,000	814,221	0.381	M	155.1
NOX	5,428,140	150,000	814,221	0.313	A	127.4
CO	5,428,140	150,000	814,221	0.0333	A	13.6
VOC	5,428,140	150,000	814,221	0.00507	A	2.1
PM-PRI	5,428,140	150,000	814,221	0.0535	A	21.8
PM-FIL	5,428,140	150,000	814,221	0.0435	A	17.7
PM-CON	5,428,140	150,000	814,221	0.0100	A	4.1
PM10-PRI	5,428,140	150,000	814,221	0.0409	A	16.7
PM10-FIL	5,428,140	150,000	814,221	0.0309	A	12.6
PM25-PRI	5,428,140	150,000	814,221	0.0326	A	13.3
PM25-FIL	5,428,140	150,000	814,221	0.0226	A	9.2
Acetaldehyde	5,428,140	150,000	814,221		A	
Acrolein	5,428,140	150,000	814,221		A	
Antimony Compounds	5,428,140	150,000	814,221	3.50E-05	A	1.42E-02
Arsenic Compounds	5,428,140	150,000	814,221	8.80E-06	A	3.58E-03
Benzene	5,428,140	150,000	814,221	1.43E-06	A	5.81E-04
Beryllium Compounds	5,428,140	150,000	814,221	1.85E-07	A	7.55E-05
1,3-Butadiene	5,428,140	150,000	814,221		A	
Cadmium Compounds	5,428,140	150,000	814,221	2.65E-06	A	1.08E-03
Chromium Compounds	5,428,140	150,000	814,221	5.63E-06	A	2.29E-03
Cobalt Compounds	5,428,140	150,000	814,221	4.01E-05	A	1.63E-02
Ethylbenzene	5,428,140	150,000	814,221	4.24E-07	A	1.73E-04
Formaldehyde	5,428,140	150,000	814,221	4.07E-04	A	1.66E-01
Hydrochloric Acid	5,428,140	150,000	814,221		A	
Lead Compounds	5,428,140	150,000	814,221	1.01E-05	A	4.10E-03
Manganese Compounds	5,428,140	150,000	814,221	2.00E-05	A	8.14E-03
Mercury Compounds	5,428,140	150,000	814,221	7.53E-07	A	3.07E-04
Nickel Compounds	5,428,140	150,000	814,221	5.63E-04	A	2.29E-01
Naphthalene	5,428,140	150,000	814,221	7.53E-06	A	3.07E-03
Phosphorus	5,428,140	150,000	814,221	6.31E-05	A	2.57E-02
POM	5,428,140	150,000	814,221	8.67E-06	A	3.53E-03
Selenium Compounds	5,428,140	150,000	814,221	4.55E-06	A	1.85E-03
Toluene	5,428,140	150,000	814,221	4.13E-05	A	1.68E-02
Xylene	5,428,140	150,000	814,221		A	
o-Xylene	5,428,140	150,000	814,221	7.27E-07	A	2.96E-04

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Waiau 4 Spec Used Oil

Pollutant	Annual Spec Oil Use (gal/yr)	Emission Factor (lb/10³ gal)	EF Ref	Annual Emissions (tons/yr)
SO2	0	11.0	A	
NOX	0	47	A	
CO	0	5	A	
VOC	0	0.76	A	
PM-PRI	0	5.36	A	
PM-FIL	0	3.86	A	
PM-CON	0	1.5	A	
PM10-PRI	0	4.24	A	
PM10-FIL	0	2.74	A	
PM25-PRI	0	3.51	A	
PM25-FIL	0	2.01	A	
Acetaldehyde	0		A	
Acrolein	0		A	
Antimony Compounds	0		A	
Arsenic Compounds	0	1.10E-01	A	
Benzene	0		A	
Beryllium Compounds	0		A	
1,3-Butadiene	0		A	
Cadmium Compounds	0	9.30E-03	A	
Chromium Compounds	0	2.00E-02	A	
Cobalt Compounds	0	2.10E-04	A	
Ethylbenzene	0		A	
Formaldehyde	0		A	
Hydrochloric Acid	0	3.30E-02	A	
Lead Compounds	0	5.50E-01	A	
Manganese Compounds	0	6.80E-02	A	
Mercury Compounds	0		A	
Nickel Compounds	0	1.10E-02	A	
Naphthalene	0		A	
Phosphorus	0		A	
POM	0		A	
Selenium Compounds	0		A	
Toluene	0		A	
Xylene	0		A	
o-Xylene	0		A	

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Waiau 4 Propane

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	1,898	91,500	174	0.00371	M	0.00032
NOX	1,898	91,500	174	0.208	A	0.01806
CO	1,898	91,500	174	0.0350	A	0.00304
VOC	1,898	91,500	174	0.00546	A	0.00047
PM-PRI	1,898	91,500	174	0.0122	A	0.00106
PM-FIL	1,898	91,500	174	0.00656	A	0.00057
PM-CON	1,898	91,500	174	0.00559	A	0.00049
PM10-PRI	1,898	91,500	174	0.0122	A	0.00106
PM10-FIL	1,898	91,500	174	0.00656	A	0.00057
PM25-PRI	1,898	91,500	174	0.0122	A	0.00106
PM25-FIL	1,898	91,500	174	0.00656	A	0.00057
Acetaldehyde	1,898	91,500	174		A	
Acrolein	1,898	91,500	174		A	
Antimony Compounds	1,898	91,500	174		A	
Arsenic Compounds	1,898	91,500	174		A	
Benzene	1,898	91,500	174		A	
Beryllium Compounds	1,898	91,500	174		A	
1,3-Butadiene	1,898	91,500	174		A	
Cadmium Compounds	1,898	91,500	174		A	
Chromium Compounds	1,898	91,500	174		A	
Cobalt Compounds	1,898	91,500	174		A	
Ethylbenzene	1,898	91,500	174		A	
Formaldehyde	1,898	91,500	174		A	
Hydrochloric Acid	1,898	91,500	174		A	
Lead Compounds	1,898	91,500	174		A	
Manganese Compounds	1,898	91,500	174		A	
Mercury Compounds	1,898	91,500	174		A	
Nickel Compounds	1,898	91,500	174		A	
Naphthalene	1,898	91,500	174		A	
Phosphorus	1,898	91,500	174		A	
POM	1,898	91,500	174		A	
Selenium Compounds	1,898	91,500	174		A	
Toluene	1,898	91,500	174		A	
Xylene	1,898	91,500	174		A	
o-Xylene	1,898	91,500	174		A	

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Waiau 4 Total

	Annual Emissions			
Pollutant	Fuel Oil (tons/yr)	Spec Used Oil (tons/yr)	Propane (tons/yr)	Total (tons/yr)
SO2	155.1		0.0003	155.1
NOX	127.4		0.0181	127.4
CO	13.6		0.0030	13.6
VOC	2.1		0.0005	2.1
PM-PRI	21.8		0.0011	21.8
PM-FIL	17.7		0.0006	17.7
PM-CON	4.1		0.0005	4.1
PM10-PRI	16.7		0.0011	16.7
PM10-FIL	12.6		0.0006	12.6
PM25-PRI	13.3		0.0011	13.3
PM25-FIL	9.2		0.0006	9.2
Acetaldehyde				
Acrolein				
Antimony Compounds	1.42E-02			1.42E-02
Arsenic Compounds	3.58E-03			3.58E-03
Benzene	5.81E-04			5.81E-04
Beryllium Compounds	7.55E-05			7.55E-05
1,3-Butadiene				
Cadmium Compounds	1.08E-03			1.08E-03
Chromium Compounds	2.29E-03			2.29E-03
Cobalt Compounds	1.63E-02			1.63E-02
Ethylbenzene	1.73E-04			1.73E-04
Formaldehyde	1.66E-01			1.66E-01
Hydrochloric Acid				
Lead Compounds	4.10E-03			4.10E-03
Manganese Compounds	8.14E-03			8.14E-03
Mercury Compounds	3.07E-04			3.07E-04
Nickel Compounds	2.29E-01			2.29E-01
Naphthalene	3.07E-03			3.07E-03
Phosphorus	2.57E-02			2.57E-02
POM	3.53E-03			3.53E-03
Selenium Compounds	1.85E-03			1.85E-03
Toluene	1.68E-02			1.68E-02
Xylene				
o-Xylene	2.96E-04			2.96E-04
Total HAPs				4.97E-01

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Waiau 5 No 6 FO

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	11,314,663	150,000	1,697,199	0.381	M	323.3
NOX	11,314,663	150,000	1,697,199	0.313	A	265.6
CO	11,314,663	150,000	1,697,199	0.0333	A	28.3
VOC	11,314,663	150,000	1,697,199	0.00507	A	4.3
PM-PRI	11,314,663	150,000	1,697,199	0.0535	A	45.4
PM-FIL	11,314,663	150,000	1,697,199	0.0435	A	36.9
PM-CON	11,314,663	150,000	1,697,199	0.0100	A	8.5
PM10-PRI	11,314,663	150,000	1,697,199	0.0409	A	34.7
PM10-FIL	11,314,663	150,000	1,697,199	0.0309	A	26.2
PM25-PRI	11,314,663	150,000	1,697,199	0.0326	A	27.7
PM25-FIL	11,314,663	150,000	1,697,199	0.0226	A	19.2
Acetaldehyde	11,314,663	150,000	1,697,199		A	
Acrolein	11,314,663	150,000	1,697,199		A	
Antimony Compounds	11,314,663	150,000	1,697,199	3.50E-05	A	2.97E-02
Arsenic Compounds	11,314,663	150,000	1,697,199	8.80E-06	A	7.47E-03
Benzene	11,314,663	150,000	1,697,199	1.43E-06	A	1.21E-03
Beryllium Compounds	11,314,663	150,000	1,697,199	1.85E-07	A	1.57E-04
1,3-Butadiene	11,314,663	150,000	1,697,199		A	
Cadmium Compounds	11,314,663	150,000	1,697,199	2.65E-06	A	2.25E-03
Chromium Compounds	11,314,663	150,000	1,697,199	5.63E-06	A	4.78E-03
Cobalt Compounds	11,314,663	150,000	1,697,199	4.01E-05	A	3.41E-02
Ethylbenzene	11,314,663	150,000	1,697,199	4.24E-07	A	3.60E-04
Formaldehyde	11,314,663	150,000	1,697,199	4.07E-04	A	3.45E-01
Hydrochloric Acid	11,314,663	150,000	1,697,199		A	
Lead Compounds	11,314,663	150,000	1,697,199	1.01E-05	A	8.54E-03
Manganese Compounds	11,314,663	150,000	1,697,199	2.00E-05	A	1.70E-02
Mercury Compounds	11,314,663	150,000	1,697,199	7.53E-07	A	6.39E-04
Nickel Compounds	11,314,663	150,000	1,697,199	5.63E-04	A	4.78E-01
Naphthalene	11,314,663	150,000	1,697,199	7.53E-06	A	6.39E-03
Phosphorus	11,314,663	150,000	1,697,199	6.31E-05	A	5.35E-02
POM	11,314,663	150,000	1,697,199	8.67E-06	A	7.35E-03
Selenium Compounds	11,314,663	150,000	1,697,199	4.55E-06	A	3.86E-03
Toluene	11,314,663	150,000	1,697,199	4.13E-05	A	3.51E-02
Xylene	11,314,663	150,000	1,697,199		A	
o-Xylene	11,314,663	150,000	1,697,199	7.27E-07	A	6.17E-04

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Waiau 5 Spec Used Oil

Pollutant	Annual Spec Oil Use (gal/yr)	Emission Factor (lb/10³ gal)	EF Ref	Annual Emissions (tons/yr)
SO2	52	11.0	A	0.0003
NOX	52	47	A	0.0012
CO	52	5	A	0.0001
VOC	52	0.76	A	0.0000
PM-PRI	52	5.36	A	0.00014
PM-FIL	52	3.86	A	0.00010
PM-CON	52	1.5	A	0.00004
PM10-PRI	52	4.24	A	0.00011
PM10-FIL	52	2.74	A	0.00007
PM25-PRI	52	3.51	A	0.00009
PM25-FIL	52	2.01	A	0.00005
Acetaldehyde	52		A	
Acrolein	52		A	
Antimony Compounds	52		A	
Arsenic Compounds	52	1.10E-01	A	2.86E-06
Benzene	52		A	
Beryllium Compounds	52		A	
1,3-Butadiene	52		A	
Cadmium Compounds	52	9.30E-03	A	2.42E-07
Chromium Compounds	52	2.00E-02	A	5.20E-07
Cobalt Compounds	52	2.10E-04	A	5.46E-09
Ethylbenzene	52		A	
Formaldehyde	52		A	
Hydrochloric Acid	52	3.30E-02	A	8.58E-07
Lead Compounds	52	5.50E-01	A	1.43E-05
Manganese Compounds	52	6.80E-02	A	1.77E-06
Mercury Compounds	52		A	
Nickel Compounds	52	1.10E-02	A	2.86E-07
Naphthalene	52		A	
Phosphorus	52		A	
POM	52		A	
Selenium Compounds	52		A	
Toluene	52		A	
Xylene	52		A	
o-Xylene	52		A	

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Waiau 5 Propane

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	4,027	91,500	368	0.00371	M	0.00068
NOX	4,027	91,500	368	0.208	A	0.03832
CO	4,027	91,500	368	0.0350	A	0.00645
VOC	4,027	91,500	368	0.00546	A	0.00101
PM-PRI	4,027	91,500	368	0.0122	A	0.00225
PM-FIL	4,027	91,500	368	0.00656	A	0.00121
PM-CON	4,027	91,500	368	0.00559	A	0.00103
PM10-PRI	4,027	91,500	368	0.0122	A	0.00225
PM10-FIL	4,027	91,500	368	0.00656	A	0.00121
PM25-PRI	4,027	91,500	368	0.0122	A	0.00225
PM25-FIL	4,027	91,500	368	0.00656	A	0.00121
Acetaldehyde	4,027	91,500	368		A	
Acrolein	4,027	91,500	368		A	
Antimony Compounds	4,027	91,500	368		A	
Arsenic Compounds	4,027	91,500	368		A	
Benzene	4,027	91,500	368		A	
Beryllium Compounds	4,027	91,500	368		A	
1,3-Butadiene	4,027	91,500	368		A	
Cadmium Compounds	4,027	91,500	368		A	
Chromium Compounds	4,027	91,500	368		A	
Cobalt Compounds	4,027	91,500	368		A	
Ethylbenzene	4,027	91,500	368		A	
Formaldehyde	4,027	91,500	368		A	
Hydrochloric Acid	4,027	91,500	368		A	
Lead Compounds	4,027	91,500	368		A	
Manganese Compounds	4,027	91,500	368		A	
Mercury Compounds	4,027	91,500	368		A	
Nickel Compounds	4,027	91,500	368		A	
Naphthalene	4,027	91,500	368		A	
Phosphorus	4,027	91,500	368		A	
POM	4,027	91,500	368		A	
Selenium Compounds	4,027	91,500	368		A	
Toluene	4,027	91,500	368		A	
Xylene	4,027	91,500	368		A	
o-Xylene	4,027	91,500	368		A	

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Waiau 5 Total

	Annual Emissions			
Pollutant	Fuel Oil (tons/yr)	Spec Used Oil (tons/yr)	Propane (tons/yr)	Total (tons/yr)
SO2	323.3	0.0003	0.0007	323.3
NOX	265.6	0.0012	0.0383	265.6
CO	28.3	0.0001	0.0064	28.3
VOC	4.3	0.0000	0.0010	4.3
PM-PRI	45.4	0.0001	0.0022	45.4
PM-FIL	36.9	0.0001	0.0012	36.9
PM-CON	8.5	0.0000	0.0010	8.5
PM10-PRI	34.7	0.0001	0.0022	34.7
PM10-FIL	26.2	0.0001	0.0012	26.2
PM25-PRI	27.7	0.0001	0.0022	27.7
PM25-FIL	19.2	0.0001	0.0012	19.2
Acetaldehyde				
Acrolein				
Antimony Compounds	2.97E-02			2.97E-02
Arsenic Compounds	7.47E-03	2.86E-06		7.47E-03
Benzene	1.21E-03			1.21E-03
Beryllium Compounds	1.57E-04			1.57E-04
1,3-Butadiene				
Cadmium Compounds	2.25E-03	2.42E-07		2.25E-03
Chromium Compounds	4.78E-03	5.20E-07		4.78E-03
Cobalt Compounds	3.41E-02	5.46E-09		3.41E-02
Ethylbenzene	3.60E-04			3.60E-04
Formaldehyde	3.45E-01			3.45E-01
Hydrochloric Acid		8.58E-07		8.58E-07
Lead Compounds	8.54E-03	1.43E-05		8.56E-03
Manganese Compounds	1.70E-02	1.77E-06		1.70E-02
Mercury Compounds	6.39E-04			6.39E-04
Nickel Compounds	4.78E-01	2.86E-07		4.78E-01
Naphthalene	6.39E-03			6.39E-03
Phosphorus	5.35E-02			5.35E-02
POM	7.35E-03			7.35E-03
Selenium Compounds	3.86E-03			3.86E-03
Toluene	3.51E-02			3.51E-02
Xylene				
o-Xylene	6.17E-04			6.17E-04
Total HAPs				1.04E+00

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Waiau 6 No 6 FO

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	9,314,052	150,000	1,397,108	0.381	M	266.1
NOX	9,314,052	150,000	1,397,108	0.313	A	218.6
CO	9,314,052	150,000	1,397,108	0.0333	A	23.3
VOC	9,314,052	150,000	1,397,108	0.00507	A	3.5
PM-PRI	9,314,052	150,000	1,397,108	0.0535	A	37.4
PM-FIL	9,314,052	150,000	1,397,108	0.0435	A	30.4
PM-CON	9,314,052	150,000	1,397,108	0.0100	A	7.0
PM10-PRI	9,314,052	150,000	1,397,108	0.0409	A	28.6
PM10-FIL	9,314,052	150,000	1,397,108	0.0309	A	21.6
PM25-PRI	9,314,052	150,000	1,397,108	0.0326	A	22.8
PM25-FIL	9,314,052	150,000	1,397,108	0.0226	A	15.8
Acetaldehyde	9,314,052	150,000	1,397,108		A	
Acrolein	9,314,052	150,000	1,397,108		A	
Antimony Compounds	9,314,052	150,000	1,397,108	3.50E-05	A	2.44E-02
Arsenic Compounds	9,314,052	150,000	1,397,108	8.80E-06	A	6.15E-03
Benzene	9,314,052	150,000	1,397,108	1.43E-06	A	9.97E-04
Beryllium Compounds	9,314,052	150,000	1,397,108	1.85E-07	A	1.29E-04
1,3-Butadiene	9,314,052	150,000	1,397,108		A	
Cadmium Compounds	9,314,052	150,000	1,397,108	2.65E-06	A	1.85E-03
Chromium Compounds	9,314,052	150,000	1,397,108	5.63E-06	A	3.94E-03
Cobalt Compounds	9,314,052	150,000	1,397,108	4.01E-05	A	2.80E-02
Ethylbenzene	9,314,052	150,000	1,397,108	4.24E-07	A	2.96E-04
Formaldehyde	9,314,052	150,000	1,397,108	4.07E-04	A	2.84E-01
Hydrochloric Acid	9,314,052	150,000	1,397,108		A	
Lead Compounds	9,314,052	150,000	1,397,108	1.01E-05	A	7.03E-03
Manganese Compounds	9,314,052	150,000	1,397,108	2.00E-05	A	1.40E-02
Mercury Compounds	9,314,052	150,000	1,397,108	7.53E-07	A	5.26E-04
Nickel Compounds	9,314,052	150,000	1,397,108	5.63E-04	A	3.94E-01
Naphthalene	9,314,052	150,000	1,397,108	7.53E-06	A	5.26E-03
Phosphorus	9,314,052	150,000	1,397,108	6.31E-05	A	4.41E-02
POM	9,314,052	150,000	1,397,108	8.67E-06	A	6.05E-03
Selenium Compounds	9,314,052	150,000	1,397,108	4.55E-06	A	3.18E-03
Toluene	9,314,052	150,000	1,397,108	4.13E-05	A	2.89E-02
Xylene	9,314,052	150,000	1,397,108		A	
o-Xylene	9,314,052	150,000	1,397,108	7.27E-07	A	5.08E-04

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Waiau 6 Spec Used Oil

Pollutant	Annual Spec Oil Use (gal/yr)	Emission Factor (lb/10³ gal)	EF Ref	Annual Emissions (tons/yr)
SO2	47	11.0	A	0.0003
NOX	47	47	A	0.0011
CO	47	5	A	0.0001
VOC	47	0.76	A	0.0000
PM-PRI	47	5.36	A	0.00013
PM-FIL	47	3.86	A	0.00009
PM-CON	47	1.5	A	0.00004
PM10-PRI	47	4.24	A	0.00010
PM10-FIL	47	2.74	A	0.00006
PM25-PRI	47	3.51	A	0.00008
PM25-FIL	47	2.01	A	0.00005
Acetaldehyde	47		A	
Acrolein	47		A	
Antimony Compounds	47		A	
Arsenic Compounds	47	1.10E-01	A	2.59E-06
Benzene	47		A	
Beryllium Compounds	47		A	
1,3-Butadiene	47		A	
Cadmium Compounds	47	9.30E-03	A	2.19E-07
Chromium Compounds	47	2.00E-02	A	4.70E-07
Cobalt Compounds	47	2.10E-04	A	4.94E-09
Ethylbenzene	47		A	
Formaldehyde	47		A	
Hydrochloric Acid	47	3.30E-02	A	7.76E-07
Lead Compounds	47	5.50E-01	A	1.29E-05
Manganese Compounds	47	6.80E-02	A	1.60E-06
Mercury Compounds	47		A	
Nickel Compounds	47	1.10E-02	A	2.59E-07
Naphthalene	47		A	
Phosphorus	47		A	
POM	47		A	
Selenium Compounds	47		A	
Toluene	47		A	
Xylene	47		A	
o-Xylene	47		A	

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Waiau 6 Propane

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	3,371	91,500	308	0.00371	M	0.00057
NOX	3,371	91,500	308	0.208	A	0.03208
CO	3,371	91,500	308	0.0350	A	0.00540
VOC	3,371	91,500	308	0.00546	A	0.00084
PM-PRI	3,371	91,500	308	0.0122	A	0.00188
PM-FIL	3,371	91,500	308	0.00656	A	0.00101
PM-CON	3,371	91,500	308	0.00559	A	0.00086
PM10-PRI	3,371	91,500	308	0.0122	A	0.00188
PM10-FIL	3,371	91,500	308	0.00656	A	0.00101
PM25-PRI	3,371	91,500	308	0.0122	A	0.00188
PM25-FIL	3,371	91,500	308	0.00656	A	0.00101
Acetaldehyde	3,371	91,500	308		A	
Acrolein	3,371	91,500	308		A	
Antimony Compounds	3,371	91,500	308		A	
Arsenic Compounds	3,371	91,500	308		A	
Benzene	3,371	91,500	308		A	
Beryllium Compounds	3,371	91,500	308		A	
1,3-Butadiene	3,371	91,500	308		A	
Cadmium Compounds	3,371	91,500	308		A	
Chromium Compounds	3,371	91,500	308		A	
Cobalt Compounds	3,371	91,500	308		A	
Ethylbenzene	3,371	91,500	308		A	
Formaldehyde	3,371	91,500	308		A	
Hydrochloric Acid	3,371	91,500	308		A	
Lead Compounds	3,371	91,500	308		A	
Manganese Compounds	3,371	91,500	308		A	
Mercury Compounds	3,371	91,500	308		A	
Nickel Compounds	3,371	91,500	308		A	
Naphthalene	3,371	91,500	308		A	
Phosphorus	3,371	91,500	308		A	
POM	3,371	91,500	308		A	
Selenium Compounds	3,371	91,500	308		A	
Toluene	3,371	91,500	308		A	
Xylene	3,371	91,500	308		A	
o-Xylene	3,371	91,500	308		A	

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Waiau 6 Total

	Annual Emissions			
Pollutant	Fuel Oil (tons/yr)	Spec Used Oil (tons/yr)	Propane (tons/yr)	Total (tons/yr)
SO2	266.1	0.0003	0.0006	266.1
NOX	218.6	0.0011	0.0321	218.6
CO	23.3	0.0001	0.0054	23.3
VOC	3.5	0.0000	0.0008	3.5
PM-PRI	37.4	0.0001	0.0019	37.4
PM-FIL	30.4	0.0001	0.0010	30.4
PM-CON	7	0.0000	0.0009	7.0
PM10-PRI	28.6	0.0001	0.0019	28.6
PM10-FIL	21.6	0.0001	0.0010	21.6
PM25-PRI	22.8	0.0001	0.0019	22.8
PM25-FIL	15.8	0.0000	0.0010	15.8
Acetaldehyde				
Acrolein				
Antimony Compounds	2.44E-02			2.44E-02
Arsenic Compounds	6.15E-03	2.59E-06		6.15E-03
Benzene	9.97E-04			9.97E-04
Beryllium Compounds	1.29E-04			1.29E-04
1,3-Butadiene				
Cadmium Compounds	1.85E-03	2.19E-07		1.85E-03
Chromium Compounds	3.94E-03	4.70E-07		3.94E-03
Cobalt Compounds	2.80E-02	4.94E-09		2.80E-02
Ethylbenzene	2.96E-04			2.96E-04
Formaldehyde	2.84E-01			2.84E-01
Hydrochloric Acid		7.76E-07		7.76E-07
Lead Compounds	7.03E-03	1.29E-05		7.05E-03
Manganese Compounds	1.40E-02	1.60E-06		1.40E-02
Mercury Compounds	5.26E-04			5.26E-04
Nickel Compounds	3.94E-01	2.59E-07		3.94E-01
Naphthalene	5.26E-03			5.26E-03
Phosphorus	4.41E-02			4.41E-02
POM	6.05E-03			6.05E-03
Selenium Compounds	3.18E-03			3.18E-03
Toluene	2.89E-02			2.89E-02
Xylene				
o-Xylene	5.08E-04			5.08E-04
Total HAPs				8.53E-01

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Waiau 7 No 6 FO

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	32,096,504	150,000	4,814,476	0.381	M	917.2
NOX	32,096,504	150,000	4,814,476	0.313	A	753.5
CO	32,096,504	150,000	4,814,476	0.0333	A	80.2
VOC	32,096,504	150,000	4,814,476	0.00507	A	12.2
PM-PRI	32,096,504	150,000	4,814,476	0.0535	A	128.8
PM-FIL	32,096,504	150,000	4,814,476	0.0435	A	104.7
PM-CON	32,096,504	150,000	4,814,476	0.0100	A	24.1
PM10-PRI	32,096,504	150,000	4,814,476	0.0409	A	98.5
PM10-FIL	32,096,504	150,000	4,814,476	0.0309	A	74.4
PM25-PRI	32,096,504	150,000	4,814,476	0.0326	A	78.5
PM25-FIL	32,096,504	150,000	4,814,476	0.0226	A	54.4
Acetaldehyde	32,096,504	150,000	4,814,476		A	
Acrolein	32,096,504	150,000	4,814,476		A	
Antimony Compounds	32,096,504	150,000	4,814,476	3.50E-05	A	8.43E-02
Arsenic Compounds	32,096,504	150,000	4,814,476	8.80E-06	A	2.12E-02
Benzene	32,096,504	150,000	4,814,476	1.43E-06	A	3.43E-03
Beryllium Compounds	32,096,504	150,000	4,814,476	1.85E-07	A	4.46E-04
1,3-Butadiene	32,096,504	150,000	4,814,476		A	
Cadmium Compounds	32,096,504	150,000	4,814,476	2.65E-06	A	6.39E-03
Chromium Compounds	32,096,504	150,000	4,814,476	5.63E-06	A	1.36E-02
Cobalt Compounds	32,096,504	150,000	4,814,476	4.01E-05	A	9.66E-02
Ethylbenzene	32,096,504	150,000	4,814,476	4.24E-07	A	1.02E-03
Formaldehyde	32,096,504	150,000	4,814,476	4.07E-04	A	9.79E-01
Hydrochloric Acid	32,096,504	150,000	4,814,476		A	
Lead Compounds	32,096,504	150,000	4,814,476	1.01E-05	A	2.42E-02
Manganese Compounds	32,096,504	150,000	4,814,476	2.00E-05	A	4.81E-02
Mercury Compounds	32,096,504	150,000	4,814,476	7.53E-07	A	1.81E-03
Nickel Compounds	32,096,504	150,000	4,814,476	5.63E-04	A	1.36E+00
Naphthalene	32,096,504	150,000	4,814,476	7.53E-06	A	1.81E-02
Phosphorus	32,096,504	150,000	4,814,476	6.31E-05	A	1.52E-01
POM	32,096,504	150,000	4,814,476	8.67E-06	A	2.09E-02
Selenium Compounds	32,096,504	150,000	4,814,476	4.55E-06	A	1.10E-02
Toluene	32,096,504	150,000	4,814,476	4.13E-05	A	9.95E-02
Xylene	32,096,504	150,000	4,814,476		A	
o-Xylene	32,096,504	150,000	4,814,476	7.27E-07	A	1.75E-03

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Waiau 7 No 2 FO

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	10,119	136,745	1,384	0.019	M	0.0131
NOX	10,119	136,745	1,384	0.171	A	0.1183
CO	10,119	136,745	1,384	0.0357	A	0.0247
VOC	10,119	136,745	1,384	0.00143	A	0.0010
PM-PRI	10,119	136,745	1,384	0.0236	A	0.0163
PM-FIL	10,119	136,745	1,384	0.0143	A	0.0099
PM-CON	10,119	136,745	1,384	0.00929	A	0.0064
PM10-PRI	10,119	136,745	1,384	0.0164	A	0.0113
PM10-FIL	10,119	136,745	1,384	0.00714	A	0.0049
PM25-PRI	10,119	136,745	1,384	0.0111	A	0.0077
PM25-FIL	10,119	136,745	1,384	0.00179	A	0.0012
Acetaldehyde	10,119	136,745	1,384		A	
Acrolein	10,119	136,745	1,384		A	
Antimony Compounds	10,119	136,745	1,384	3.75E-05	A	2.59E-05
Arsenic Compounds	10,119	136,745	1,384	4.00E-06	A	2.77E-06
Benzene	10,119	136,745	1,384	1.53E-06	A	1.06E-06
Beryllium Compounds	10,119	136,745	1,384	3.00E-06	A	2.08E-06
1,3-Butadiene	10,119	136,745	1,384		A	
Cadmium Compounds	10,119	136,745	1,384	3.00E-06	A	2.08E-06
Chromium Compounds	10,119	136,745	1,384	3.00E-06	A	2.08E-06
Cobalt Compounds	10,119	136,745	1,384	4.30E-05	A	2.98E-05
Ethylbenzene	10,119	136,745	1,384	4.54E-07	A	3.14E-07
Formaldehyde	10,119	136,745	1,384	4.36E-04	A	3.01E-04
Hydrochloric Acid	10,119	136,745	1,384		A	
Lead Compounds	10,119	136,745	1,384	9.00E-06	A	6.23E-06
Manganese Compounds	10,119	136,745	1,384	6.00E-06	A	4.15E-06
Mercury Compounds	10,119	136,745	1,384	3.00E-06	A	2.08E-06
Nickel Compounds	10,119	136,745	1,384	3.00E-06	A	2.08E-06
Naphthalene	10,119	136,745	1,384	8.07E-06	A	5.58E-06
Phosphorus	10,119	136,745	1,384	6.76E-05	A	4.68E-05
POM	10,119	136,745	1,384	9.29E-06	A	6.42E-06
Selenium Compounds	10,119	136,745	1,384	1.50E-05	A	1.04E-05
Toluene	10,119	136,745	1,384	4.43E-05	A	3.06E-05
Xylene	10,119	136,745	1,384		A	
o-Xylene	10,119	136,745	1,384	7.79E-07	A	5.39E-07

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Waiau 7 Spec Used Oil

Pollutant	Annual Spec Oil Use (gal/yr)	Emission Factor (lb/10³ gal)	EF Ref	Annual Emissions (tons/yr)
SO2	170	11.0	A	0.0009
NOX	170	47	A	0.0040
CO	170	5	A	0.0004
VOC	170	0.76	A	0.0001
PM-PRI	170	5.36	A	0.00046
PM-FIL	170	3.86	A	0.00033
PM-CON	170	1.5	A	0.00013
PM10-PRI	170	4.24	A	0.00036
PM10-FIL	170	2.74	A	0.00023
PM25-PRI	170	3.51	A	0.00030
PM25-FIL	170	2.01	A	0.00017
Acetaldehyde	170		A	
Acrolein	170		A	
Antimony Compounds	170		A	
Arsenic Compounds	170	1.10E-01	A	9.35E-06
Benzene	170		A	
Beryllium Compounds	170		A	
1,3-Butadiene	170		A	
Cadmium Compounds	170	9.30E-03	A	7.91E-07
Chromium Compounds	170	2.00E-02	A	1.70E-06
Cobalt Compounds	170	2.10E-04	A	1.79E-08
Ethylbenzene	170		A	
Formaldehyde	170		A	
Hydrochloric Acid	170	3.30E-02	A	2.81E-06
Lead Compounds	170	5.50E-01	A	4.68E-05
Manganese Compounds	170	6.80E-02	A	5.78E-06
Mercury Compounds	170		A	
Nickel Compounds	170	1.10E-02	A	9.35E-07
Naphthalene	170		A	
Phosphorus	170		A	
POM	170		A	
Selenium Compounds	170		A	
Toluene	170		A	
Xylene	170		A	
o-Xylene	170		A	

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Waiau 7 Total

Pollutant	Annual Emissions No 6 Fuel Oil (tons/yr)	No 2 Fuel Oil (tons/yr)	Spec Used Oil (tons/yr)	Total (tons/yr)
SO2	917.2	0.0131	0.0009	917.2
NOX	753.5	0.1183	0.0040	753.6
CO	80.2	0.0247	0.0004	80.2
VOC	12.2	0.0010	0.0001	12.2
PM-PRI	128.8	0.0163	0.0005	128.8
PM-FIL	104.7	0.0099	0.0003	104.7
PM-CON	24.1	0.0064	0.0001	24.1
PM10-PRI	98.5	0.0113	0.0004	98.5
PM10-FIL	74.4	0.0049	0.0002	74.4
PM25-PRI	78.5	0.0077	0.0003	78.5
PM25-FIL	54.4	0.0012	0.0002	54.4
Acetaldehyde				
Acrolein				
Antimony Compounds	8.43E-02	2.59E-05		8.43E-02
Arsenic Compounds	2.12E-02	2.77E-06	9.35E-06	2.12E-02
Benzene	3.43E-03	1.06E-06		3.44E-03
Beryllium Compounds	4.46E-04	2.08E-06		4.48E-04
1,3-Butadiene				
Cadmium Compounds	6.39E-03	2.08E-06	7.91E-07	6.39E-03
Chromium Compounds	1.36E-02	2.08E-06	1.70E-06	1.36E-02
Cobalt Compounds	9.66E-02	2.98E-05	1.79E-08	9.66E-02
Ethylbenzene	1.02E-03	3.14E-07		1.02E-03
Formaldehyde	9.79E-01	3.01E-04		9.79E-01
Hydrochloric Acid			2.81E-06	2.81E-06
Lead Compounds	2.42E-02	6.23E-06	4.68E-05	2.43E-02
Manganese Compounds	4.81E-02	4.15E-06	5.78E-06	4.82E-02
Mercury Compounds	1.81E-03	2.08E-06		1.82E-03
Nickel Compounds	1.36E+00	2.08E-06	9.35E-07	1.36E+00
Naphthalene	1.81E-02	5.58E-06		1.81E-02
Phosphorus	1.52E-01	4.68E-05		1.52E-01
POM	2.09E-02	6.42E-06		2.09E-02
Selenium Compounds	1.10E-02	1.04E-05		1.10E-02
Toluene	9.95E-02	3.06E-05		9.95E-02
Xylene				
o-Xylene	1.75E-03	5.39E-07		1.75E-03
Total HAPs				2.94E+00

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Waiau 8 No 6 FO

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	30,653,053	150,000	4,597,958	0.381	M	875.9
NOX	30,653,053	150,000	4,597,958	0.313	A	719.6
CO	30,653,053	150,000	4,597,958	0.0333	A	76.6
VOC	30,653,053	150,000	4,597,958	0.00507	A	11.7
PM-PRI	30,653,053	150,000	4,597,958	0.0535	A	123.0
PM-FIL	30,653,053	150,000	4,597,958	0.0435	A	100.0
PM-CON	30,653,053	150,000	4,597,958	0.0100	A	23.0
PM10-PRI	30,653,053	150,000	4,597,958	0.0409	A	94.0
PM10-FIL	30,653,053	150,000	4,597,958	0.0309	A	71.0
PM25-PRI	30,653,053	150,000	4,597,958	0.0326	A	74.9
PM25-FIL	30,653,053	150,000	4,597,958	0.0226	A	52.0
Acetaldehyde	30,653,053	150,000	4,597,958		A	
Acrolein	30,653,053	150,000	4,597,958		A	
Antimony Compounds	30,653,053	150,000	4,597,958	3.50E-05	A	8.05E-02
Arsenic Compounds	30,653,053	150,000	4,597,958	8.80E-06	A	2.02E-02
Benzene	30,653,053	150,000	4,597,958	1.43E-06	A	3.28E-03
Beryllium Compounds	30,653,053	150,000	4,597,958	1.85E-07	A	4.26E-04
1,3-Butadiene	30,653,053	150,000	4,597,958		A	
Cadmium Compounds	30,653,053	150,000	4,597,958	2.65E-06	A	6.10E-03
Chromium Compounds	30,653,053	150,000	4,597,958	5.63E-06	A	1.30E-02
Cobalt Compounds	30,653,053	150,000	4,597,958	4.01E-05	A	9.23E-02
Ethylbenzene	30,653,053	150,000	4,597,958	4.24E-07	A	9.75E-04
Formaldehyde	30,653,053	150,000	4,597,958	4.07E-04	A	9.35E-01
Hydrochloric Acid	30,653,053	150,000	4,597,958		A	
Lead Compounds	30,653,053	150,000	4,597,958	1.01E-05	A	2.31E-02
Manganese Compounds	30,653,053	150,000	4,597,958	2.00E-05	A	4.60E-02
Mercury Compounds	30,653,053	150,000	4,597,958	7.53E-07	A	1.73E-03
Nickel Compounds	30,653,053	150,000	4,597,958	5.63E-04	A	1.30E+00
Naphthalene	30,653,053	150,000	4,597,958	7.53E-06	A	1.73E-02
Phosphorus	30,653,053	150,000	4,597,958	6.31E-05	A	1.45E-01
POM	30,653,053	150,000	4,597,958	8.67E-06	A	1.99E-02
Selenium Compounds	30,653,053	150,000	4,597,958	4.55E-06	A	1.05E-02
Toluene	30,653,053	150,000	4,597,958	4.13E-05	A	9.50E-02
Xylene	30,653,053	150,000	4,597,958		A	
o-Xylene	30,653,053	150,000	4,597,958	7.27E-07	A	1.67E-03

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Waiau 8 No 2 FO

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	9,291	136,745	1,270	0.019	M	0.0121
NOX	9,291	136,745	1,270	0.171	A	0.1086
CO	9,291	136,745	1,270	0.0357	A	0.0227
VOC	9,291	136,745	1,270	0.00143	A	0.0009
PM-PRI	9,291	136,745	1,270	0.0236	A	0.0150
PM-FIL	9,291	136,745	1,270	0.0143	A	0.0091
PM-CON	9,291	136,745	1,270	0.00929	A	0.0059
PM10-PRI	9,291	136,745	1,270	0.0164	A	0.0104
PM10-FIL	9,291	136,745	1,270	0.00714	A	0.0045
PM25-PRI	9,291	136,745	1,270	0.0111	A	0.0071
PM25-FIL	9,291	136,745	1,270	0.00179	A	0.0011
Acetaldehyde	9,291	136,745	1,270		A	
Acrolein	9,291	136,745	1,270		A	
Antimony Compounds	9,291	136,745	1,270	3.75E-05	A	2.38E-05
Arsenic Compounds	9,291	136,745	1,270	4.00E-06	A	2.54E-06
Benzene	9,291	136,745	1,270	1.53E-06	A	9.71E-07
Beryllium Compounds	9,291	136,745	1,270	3.00E-06	A	1.91E-06
1,3-Butadiene	9,291	136,745	1,270		A	
Cadmium Compounds	9,291	136,745	1,270	3.00E-06	A	1.91E-06
Chromium Compounds	9,291	136,745	1,270	3.00E-06	A	1.91E-06
Cobalt Compounds	9,291	136,745	1,270	4.30E-05	A	2.73E-05
Ethylbenzene	9,291	136,745	1,270	4.54E-07	A	2.89E-07
Formaldehyde	9,291	136,745	1,270	4.36E-04	A	2.77E-04
Hydrochloric Acid	9,291	136,745	1,270		A	
Lead Compounds	9,291	136,745	1,270	9.00E-06	A	5.72E-06
Manganese Compounds	9,291	136,745	1,270	6.00E-06	A	3.81E-06
Mercury Compounds	9,291	136,745	1,270	3.00E-06	A	1.91E-06
Nickel Compounds	9,291	136,745	1,270	3.00E-06	A	1.91E-06
Naphthalene	9,291	136,745	1,270	8.07E-06	A	5.13E-06
Phosphorus	9,291	136,745	1,270	6.76E-05	A	4.29E-05
POM	9,291	136,745	1,270	9.29E-06	A	5.90E-06
Selenium Compounds	9,291	136,745	1,270	1.50E-05	A	9.53E-06
Toluene	9,291	136,745	1,270	4.43E-05	A	2.81E-05
Xylene	9,291	136,745	1,270		A	
o-Xylene	9,291	136,745	1,270	7.79E-07	A	4.95E-07

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Waiau 8 Spec Used Oil

Pollutant	Annual Spec Oil Use (gal/yr)	Emission Factor (lb/10³ gal)	EF Ref	Annual Emissions (tons/yr)
SO2	116	11.0	A	0.0006
NOX	116	47	A	0.0027
CO	116	5	A	0.0003
VOC	116	0.76	A	0.0000
PM-PRI	116	5.36	A	0.00031
PM-FIL	116	3.86	A	0.00022
PM-CON	116	1.5	A	0.00009
PM10-PRI	116	4.24	A	0.00025
PM10-FIL	116	2.74	A	0.00016
PM25-PRI	116	3.51	A	0.00020
PM25-FIL	116	2.01	A	0.00012
Acetaldehyde	116		A	
Acrolein	116		A	
Antimony Compounds	116		A	
Arsenic Compounds	116	1.10E-01	A	6.38E-06
Benzene	116		A	
Beryllium Compounds	116		A	
1,3-Butadiene	116		A	
Cadmium Compounds	116	9.30E-03	A	5.39E-07
Chromium Compounds	116	2.00E-02	A	1.16E-06
Cobalt Compounds	116	2.10E-04	A	1.22E-08
Ethylbenzene	116		A	
Formaldehyde	116		A	
Hydrochloric Acid	116	3.30E-02	A	1.91E-06
Lead Compounds	116	5.50E-01	A	3.19E-05
Manganese Compounds	116	6.80E-02	A	3.94E-06
Mercury Compounds	116		A	
Nickel Compounds	116	1.10E-02	A	6.38E-07
Naphthalene	116		A	
Phosphorus	116		A	
POM	116		A	
Selenium Compounds	116		A	
Toluene	116		A	
Xylene	116		A	
o-Xylene	116		A	

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Waiau 8 Total

Pollutant	Annual Emissions No. 6 Fuel Oil (tons/yr)	No. 2 Fuel Oil (tons/yr)	Spec Oil (tons/yr)	Total (tons/yr)
SO2	875.9	0.0121	0.0006	875.9
NOX	719.6	0.1086	0.0027	719.7
CO	76.6	0.0227	0.0003	76.6
VOC	11.7	0.0009	0.0000	11.7
PM-PRI	123	0.0150	0.0003	123.0
PM-FIL	100	0.0091	0.0002	100.0
PM-CON	23	0.0059	0.0001	23.0
PM10-PRI	94	0.0104	0.0002	94.0
PM10-FIL	71	0.0045	0.0002	71.0
PM25-PRI	74.9	0.0071	0.0002	74.9
PM25-FIL	52	0.0011	0.0001	52.0
Acetaldehyde				
Acrolein				
Antimony Compounds	8.05E-02	2.38E-05		8.05E-02
Arsenic Compounds	2.02E-02	2.54E-06	6.38E-06	2.02E-02
Benzene	3.28E-03	9.71E-07		3.28E-03
Beryllium Compounds	4.26E-04	1.91E-06		4.28E-04
1,3-Butadiene				
Cadmium Compounds	6.10E-03	1.91E-06	5.39E-07	6.10E-03
Chromium Compounds	1.30E-02	1.91E-06	1.16E-06	1.30E-02
Cobalt Compounds	9.23E-02	2.73E-05	1.22E-08	9.23E-02
Ethylbenzene	9.75E-04	2.89E-07		9.75E-04
Formaldehyde	9.35E-01	2.77E-04		9.35E-01
Hydrochloric Acid			1.91E-06	1.91E-06
Lead Compounds	2.31E-02	5.72E-06	3.19E-05	2.32E-02
Manganese Compounds	4.60E-02	3.81E-06	3.94E-06	4.60E-02
Mercury Compounds	1.73E-03	1.91E-06		1.73E-03
Nickel Compounds	1.30E+00	1.91E-06	6.38E-07	1.30E+00
Naphthalene	1.73E-02	5.13E-06		1.73E-02
Phosphorus	1.45E-01	4.29E-05		1.45E-01
POM	1.99E-02	5.90E-06		1.99E-02
Selenium Compounds	1.05E-02	9.53E-06		1.05E-02
Toluene	9.50E-02	2.81E-05		9.51E-02
Xylene				
o-Xylene	1.67E-03	4.95E-07		1.67E-03
Total HAPs				2.81E+00

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Waiau 9

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	1,794,139	136,745	245,340	0.064	M	7.9
NOX	1,794,139	136,745	245,340	0.88	A	107.9
CO	1,794,139	136,745	245,340	0.0033	A	0.4
VOC	1,794,139	136,745	245,340	0.00041	A	0.05
PM-PRI	1,794,139	136,745	245,340	0.012	A	1.5
PM-FIL	1,794,139	136,745	245,340	0.0043	A	0.5
PM-CON	1,794,139	136,745	245,340	0.0072	A	0.9
PM10-PRI	1,794,139	136,745	245,340	0.01133	A	1.4
PM10-FIL	1,794,139	136,745	245,340	0.00413	A	0.5
PM25-PRI	1,794,139	136,745	245,340	0.01107	A	1.4
PM25-FIL	1,794,139	136,745	245,340	0.00387	A	0.5
Acetaldehyde	1,794,139	136,745	245,340	2.52E-05	A	3.09E-03
Acrolein	1,794,139	136,745	245,340	7.88E-06	A	9.67E-04
Antimony Compounds	1,794,139	136,745	245,340		A	
Arsenic Compounds	1,794,139	136,745	245,340	1.10E-05	A	1.35E-03
Benzene	1,794,139	136,745	245,340	5.50E-05	A	6.75E-03
Beryllium Compounds	1,794,139	136,745	245,340	3.10E-07	A	3.80E-05
1,3-Butadiene	1,794,139	136,745	245,340	1.60E-05	A	1.96E-03
Cadmium Compounds	1,794,139	136,745	245,340	4.80E-06	A	5.89E-04
Chromium Compounds	1,794,139	136,745	245,340	1.10E-05	A	1.35E-03
Cobalt Compounds	1,794,139	136,745	245,340		A	
Ethylbenzene	1,794,139	136,745	245,340		A	
Formaldehyde	1,794,139	136,745	245,340	2.80E-04	A	3.43E-02
Hydrochloric Acid	1,794,139	136,745	245,340		A	
Lead Compounds	1,794,139	136,745	245,340	1.40E-05	A	1.72E-03
Manganese Compounds	1,794,139	136,745	245,340	7.90E-04	A	9.69E-02
Mercury Compounds	1,794,139	136,745	245,340	1.20E-06	A	1.47E-04
Nickel Compounds	1,794,139	136,745	245,340	4.60E-06	A	5.64E-04
Naphthalene	1,794,139	136,745	245,340	3.50E-05	A	4.29E-03
Phosphorus	1,794,139	136,745	245,340		A	
POM	1,794,139	136,745	245,340	4.00E-05	A	4.91E-03
Selenium Compounds	1,794,139	136,745	245,340	2.50E-05	A	3.07E-03
Toluene	1,794,139	136,745	245,340	2.81E-04	A	3.45E-02
Xylene	1,794,139	136,745	245,340	1.93E-04	A	2.37E-02
o-Xylene	1,794,139	136,745	245,340		A	
Total HAPs						2.20E-01

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Waiau 10

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	980,087	136,745	134,022	0.064	M	4.3
NOX	980,087	136,745	134,022	0.88	A	59.0
CO	980,087	136,745	134,022	0.0033	A	0.2
VOC	980,087	136,745	134,022	0.00041	A	0.03
PM-PRI	980,087	136,745	134,022	0.012	A	0.8
PM-FIL	980,087	136,745	134,022	0.0043	A	0.3
PM-CON	980,087	136,745	134,022	0.0072	A	0.5
PM10-PRI	980,087	136,745	134,022	0.01133	A	0.8
PM10-FIL	980,087	136,745	134,022	0.00413	A	0.3
PM25-PRI	980,087	136,745	134,022	0.01107	A	0.7
PM25-FIL	980,087	136,745	134,022	0.00387	A	0.3
Acetaldehyde	980,087	136,745	134,022	2.52E-05	A	1.69E-03
Acrolein	980,087	136,745	134,022	7.88E-06	A	5.28E-04
Antimony Compounds	980,087	136,745	134,022		A	
Arsenic Compounds	980,087	136,745	134,022	1.10E-05	A	7.37E-04
Benzene	980,087	136,745	134,022	5.50E-05	A	3.69E-03
Beryllium Compounds	980,087	136,745	134,022	3.10E-07	A	2.08E-05
1,3-Butadiene	980,087	136,745	134,022	1.60E-05	A	1.07E-03
Cadmium Compounds	980,087	136,745	134,022	4.80E-06	A	3.22E-04
Chromium Compounds	980,087	136,745	134,022	1.10E-05	A	7.37E-04
Cobalt Compounds	980,087	136,745	134,022		A	
Ethylbenzene	980,087	136,745	134,022		A	
Formaldehyde	980,087	136,745	134,022	2.80E-04	A	1.88E-02
Hydrochloric Acid	980,087	136,745	134,022		A	
Lead Compounds	980,087	136,745	134,022	1.40E-05	A	9.38E-04
Manganese Compounds	980,087	136,745	134,022	7.90E-04	A	5.29E-02
Mercury Compounds	980,087	136,745	134,022	1.20E-06	A	8.04E-05
Nickel Compounds	980,087	136,745	134,022	4.60E-06	A	3.08E-04
Naphthalene	980,087	136,745	134,022	3.50E-05	A	2.35E-03
Phosphorus	980,087	136,745	134,022		A	
POM	980,087	136,745	134,022	4.00E-05	A	2.68E-03
Selenium Compounds	980,087	136,745	134,022	2.50E-05	A	1.68E-03
Toluene	980,087	136,745	134,022	2.81E-04	A	1.88E-02
Xylene	980,087	136,745	134,022	1.93E-04	A	1.29E-02
o-Xylene	980,087	136,745	134,022		A	
Total HAPs						1.20E-01

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Summary

Pollutant	Annual Emissions (tons/year)								
	Waiau 3	Waiau 4	Waiau 5	Waiau 6	Waiau 7	Waiau 8	Waiau 9	Waiau 10	Total
SO2	174.5	155.1	323.3	266.1	917.2	875.9	7.9	4.3	2,724.3
NOX	143.4	127.4	265.6	218.6	753.6	719.7	107.9	59.0	2,395.2
CO	15.3	13.6	28.3	23.3	80.2	76.6	0.4	0.2	237.9
VOC	2.3	2.1	4.3	3.5	12.2	11.7	0.1	0.0	36.2
PM-PRI	24.5	21.8	45.4	37.4	128.8	123.0	1.5	0.8	383.2
PM-FIL	19.9	17.7	36.9	30.4	104.7	100.0	0.5	0.3	310.4
PM-CON	4.6	4.1	8.5	7.0	24.1	23.0	0.9	0.5	72.7
PM10-PRI	18.7	16.7	34.7	28.6	98.5	94.0	1.4	0.8	293.4
PM10-FIL	14.2	12.6	26.2	21.6	74.4	71.0	0.5	0.3	220.8
PM25-PRI	14.9	13.3	27.7	22.8	78.5	74.9	1.4	0.7	234.2
PM25-FIL	10.4	9.2	19.2	15.8	54.4	52.0	0.5	0.3	161.8
Acetaldehyde	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Acrolein	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Antimony Compounds	0.0000	0.0000	0.0000	0.0000	0.1000	0.1000	0.0000	0.0000	
Arsenic Compounds	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Benzene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Beryllium Compounds	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
1,3-Butadiene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Cadmium Compounds	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Chromium Compounds	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Cobalt Compounds	0.0000	0.0000	0.0000	0.0000	0.1000	0.1000	0.0000	0.0000	
Ethylbenzene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Formaldehyde	0.2000	0.2000	0.3000	0.3000	1.0000	0.9000	0.0000	0.0000	
Hydrochloric Acid	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Lead Compounds	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Manganese Compounds	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1000	0.1000	
Mercury Compounds	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Nickel Compounds	0.3000	0.2000	0.5000	0.4000	1.4000	1.3000	0.0000	0.0000	
Naphthalene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Phosphorus	0.0000	0.0000	0.1000	0.0000	0.2000	0.1000	0.0000	0.0000	
POM	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Selenium Compounds	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Toluene	0.0000	0.0000	0.0000	0.0000	0.1000	0.1000	0.0000	0.0000	
Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
o-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Total HAPS	0.5	0.4	0.9	0.7	2.9	2.6	0.1	0.1	

bc (w/o enc): D. Giovanni
J. Clary (JCA)

bc (w/enc): G. Murata
Q. Komori
Environmental Compliance File: Date & Title

Hawaiian Electric Company, Inc. • PO Box 2750 • Honolulu, HI 96840-0001

Honolulu

April 27, 2007

Sherri-Ann Loo, Esq.
Manager
Environmental Department

Mr. Wilfred K. Nagamine
Manager, Clean Air Branch
Hawaii State Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

Subject: 2006 Hawaii Emissions Inventory Reports and Annual Fee Payment
Honolulu Generating Station
Covered Source Permit (CSP) No. 0238-01-C
Hawaiian Electric Company, Inc. (HECO)

Dear Mr. Nagamine:

In accordance with the above referenced CSP, enclosed are the 2006 Hawaii Emissions Inventory Reports for the subject facility. On February 27, 2007, the Department of Health granted written approval for an Extension of the Annual Fee Payment and Emission Summary Submittals.

In addition to the 2006 Hawaii Emissions Inventory Reports are the following:

- Form F-1, 2007 Annual Fee Summary for Covered Sources
- Check No. 71283, made to the order of, HI State-Dept of Health-CAB, Clean Air Special Fund – COV, in the amount of $34,807.53.
- Check No. 646324, made to the order of, HI State-Dept of Health-CAB, Clean Air Special Fund – NON, in the amount of $ 8,482.30.

If you have any question, please call Ms. Queenie Komori at 543-4526.

Sincerely,

Enclosures
c (w/o encl): T. Simmons

HAWAIIAN ELECTRIC COMPANY, INC.

DATE	CHECK NO.
04/24/07	646324
HECO	006202

he attached Check is in Payment of the following Invoice(s):

Date	Invoice/Credit Memo	Type	Description	Gross	Discount	Net
4/12/07	04122007			8482.30		8482.30
	2007 ANNUAL FEE FOR HPP,		CSP NO. 0238-01-C			
			TOTAL	8482.30	0.00	8482.30

REMOVE DOCUMENT ALONG THIS PERFORATION

HAWAIIAN ELECTRIC COMPANY, INC.

Bank of Hawaii
Honolulu, Hawaii
59-102
1213

CHECK NO.
646324

PAY EIGHT THOUSAND FOUR HUNDRED EIGHTY TWO DOLLARS AND 30 CENTS

TO THE ORDER OF

HI STATE-DEPT OF HEALTH-CAB
CLEAN AIR SPECIAL FUND - NON
P.O. BOX 3378
HONOLULU HI 96801

DATE: 04/24/07

CHECK AMOUNT: **********8,482.30

Jayne S.Y. Sekiya

⑈646324⑈ ⑆121301028⑆ 0081⑈03268⑈

S2020

HAWAIIAN ELECTRIC COMPANY, INC.

DATE	CHECK NO.
04/24/07	71283
HECO	006201

The attached Check is in Payment of the following Invoice(s):

Date	Invoice/Credit Memo	Type	Description	Gross	Discount	Net
04/12/07	04122007B			34807.53		34807.53
	2007 ANNUAL FEE FOR HPP, CSP NO. 0238-01-C					
			TOTAL	34807.53	0.00	34807.53

REMOVE DOCUMENT ALONG THIS PERFORATION

HAWAIIAN ELECTRIC COMPANY, INC.

Bank of Hawaii
Honolulu, Hawaii

59-102 / 1213

CHECK NO. 71283

PAY THIRTY FOUR THOUSAND EIGHT HUNDRED SEVEN DOLLARS AND 53 CENTS

TO THE ORDER OF

	DATE	CHECK AMOUNT
HI STATE-DEPT. OF HEALTH-CAB CLEAN AIR SPECIAL FUND - COV P.O. BOX 3378 HONOLULU HI 96801	04/24/07	********34,807.53

⑈071283⑈ ⑆121301028⑆ 0081⑈032688⑈

SEE REVERSE SIDE FOR OPENING INSTRUCTIONS

Hawaiian Electric Company, Inc.
PO BOX 2750 HONOLULU, HI 96840-0001
KS3-AD

HI STATE-DEPT. OF HEALTH-CAB
CLEAN AIR SPECIAL FUND - COV
P.O. BOX 3378
HONOLULU HI 96801

71283

2006 HAWAII EMISSIONS INVENTORY REPORT
FACILITY GENERAL INFORMATION FORM

FIPS State-County-Facility ID: 1500300500

DATA REPRESENTATIVE OF JANUARY 1, 2006 - DECEMBER 31, 2006
(Form instructions are located on the Facility General Information Form Instructions)

1) Facility Name: HECO - Honolulu Generating Station

2) Permit No(s).: 0238-01-C

3) Physical Facility Address:

Street: 170 Ala Moana Blvd.

City: Honolulu Zip Code: 96813

4) Emissions Inventory Contact Person Information:

Contact Name:	Phone # + ext:	Fax #	Internet (E-mail) Address:
Queenie Komori	(808) 543-4526	(808) 543-4511	q.komori@heco.com
Mailing Address:	**Mailing City:**	**State:**	**Zip Code:**
P.O. Box 2750	Honolulu	HI	96840

5) Identify CERR source type (CERR thresholds found on the first page of the General Instructions):
(select one) Type A: _____ Type B: X Neither: _____

6) SIC Code (Primary / Secondary): 4911 / _____ 7) NAICS Code: 221112

8) Principal Product: Electrical Generation

9) Facility UTM coordinates (m): Horizontal (x): 617550 (Easting (m)) Vertical (y): 2356600 (Northing (m))

Zone: 4 (Zone 4 or 5) Datum: Old Hawaiian (e.g., NAD 83, NAD 27, or Old Hawaiian)

10) When the 2006 Hawaii Emissions Inventory Report has been completed, please sign and date below.

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record.

Signature: Thomas C. Simmons

Name: Thomas C. Simmons Date: 4/27/07
Responsible Official

Title: VP, Power Supply

Permit No.:	0238-01-C
Date Rec'd:	

FORM F-1

2007 ANNUAL FEE SUMMARY FOR COVERED SOURCES

(FOR AIR POLLUTANTS EMITTED DURING CALENDAR YEAR 2006)

INPUT DATA IN YELLOW COLORED CELLS

1. FACILITY INFORMATION (Signature box to be signed by Responsible Official)

A. Facility Name:	HECO - Honolulu Generating Station	B. Location:	170 Ala Moana Blvd.	C. Island:	Oahu
D. Mailing Address:	P.O. Box 2750	E. City:	Honolulu F. State: HI	G. Zip Code:	96840
H. Contact Person:	Queenie Komori	I. Title:	Senior Environmental Scientist	J. Telephone No.:	(808) 543-4526
K. Responsible Official:	Thomas C. Simmons	L. Title:	VP, Power Supply	M. Telephone No.	(808) 543-4301
N. Signature:	Thomas C. Simmons	Date:	4/27/07		

Based on the information and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete

2. CALCULATED EMISSIONS [Report emissions to the nearest tenth of a ton (Line 2.B.) and total annual emis. (Line 2.C.) subject to fees without the fraction(s) of a ton]

Equipment: Unit No. or Activity No.	Air Pollutant Emissions (tons/yr)												
	Other Regulated Air Pollutants Including Hazardous Air Pollutants (please specify)												Annual Total
	TSP	PM_{10}	$PM_{2.5}$	SO_2	CO	NOx	VOC	Pb	HAPs	NH_3			
8	31.6	24.0	19.0	250.9	18.0	169.8	2.7	0.0	0.7	--			
9	23.1	17.5	13.9	183.2	13.2	123.9	2.0	0.0	0.5	--			
A. Supplement (if appl.)													
B. Total Report Emissions	54.7	41.5	32.9	434.1	31.2	293.7	4.7	0.0	1.2	--			
C. Total Emissions Subject to Fees	54			434		293	4						D. 785

3 ANNUAL FEE CALCULATION (Use the total annual emissions subject to fees calculated in Block 2.D.)

		Total Annual Emissions Subject to Fees (enter 2.D. value below)		Multiply	2006 $/TON	Multiply	CPI Index Adjustmn (3.6% incr. '04 to '05)	Equal		Total
Fee payable to:	"Clean Air Special Fund - COV"	A.	785	x	42.80	x	1.036	=	B.	$34,807.53
	"Clean Air Special Fund - NON"	C.	785	x	10.43	x	1.036	=	D.	$8,482.30
							Total	=	E.	$43,289.83

Note: 2007 $/ton charge payable to Clean Air Special Fund - COV = $42.80 x 1.036 = $44.34/ton.
2007 $/ton charge payable to Clean Air Special Fund - NON = $10.43 x 1.036 = $10.81/ton.
If the summed amount found in 3.E is less than $500, then pay the minimum amount of $500, with a check made payable to the 'Clean Air Special Fund - COV.'
If the summed amount found in 3.E is greater than $500, then pay the fee amounts found in 3.B & 3.D with two separate checks made payable to the 'Clean Air Special Fund - COV' & 'Clean Air Special Fund - NON,' respectively.

Honolulu 8 No 6 FO

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	7,233,103	149,810	1,083,591	0.463	M	250.9
NOX	7,233,103	149,810	1,083,591	0.313	A	169.6
CO	7,233,103	149,810	1,083,591	0.0333	A	18.0
VOC	7,233,103	149,810	1,083,591	0.00507	A	2.7
PM-PRI	7,233,103	149,810	1,083,591	0.0583	A	31.6
PM-FIL	7,233,103	149,810	1,083,591	0.0483	A	26.2
PM-CON	7,233,103	149,810	1,083,591	0.0100	A	5.4
PM10-PRI	7,233,103	149,810	1,083,591	0.0443	A	24.0
PM10-FIL	7,233,103	149,810	1,083,591	0.0343	A	18.6
PM25-PRI	7,233,103	149,810	1,083,591	0.0351	A	19.0
PM25-FIL	7,233,103	149,810	1,083,591	0.0251	A	13.6
Acetaldehyde	7,233,103	149,810	1,083,591		A	
Acrolein	7,233,103	149,810	1,083,591		A	
Antimony Compounds	7,233,103	149,810	1,083,591	3.50E-05	A	1.90E-02
Arsenic Compounds	7,233,103	149,810	1,083,591	8.80E-06	A	4.77E-03
Benzene	7,233,103	149,810	1,083,591	1.43E-06	A	7.73E-04
Beryllium Compounds	7,233,103	149,810	1,083,591	1.85E-07	A	1.00E-04
1,3-Butadiene	7,233,103	149,810	1,083,591		A	
Cadmium Compounds	7,233,103	149,810	1,083,591	2.65E-06	A	1.44E-03
Chromium Compounds	7,233,103	149,810	1,083,591	5.63E-06	A	3.05E-03
Cobalt Compounds	7,233,103	149,810	1,083,591	4.01E-05	A	2.17E-02
Ethylbenzene	7,233,103	149,810	1,083,591	4.24E-07	A	2.30E-04
Formaldehyde	7,233,103	149,810	1,083,591	4.07E-04	A	2.20E-01
Hydrochloric Acid	7,233,103	149,810	1,083,591		A	
Lead Compounds	7,233,103	149,810	1,083,591	1.01E-05	A	5.45E-03
Manganese Compounds	7,233,103	149,810	1,083,591	2.00E-05	A	1.08E-02
Mercury Compounds	7,233,103	149,810	1,083,591	7.53E-07	A	4.08E-04
Nickel Compounds	7,233,103	149,810	1,083,591	5.63E-04	A	3.05E-01
Naphthalene	7,233,103	149,810	1,083,591	7.53E-06	A	4.08E-03
Phosphorus	7,233,103	149,810	1,083,591	6.31E-05	A	3.42E-02
POM	7,233,103	149,810	1,083,591	8.67E-06	A	4.70E-03
Selenium Compounds	7,233,103	149,810	1,083,591	4.55E-06	A	2.47E-03
Toluene	7,233,103	149,810	1,083,591	4.13E-05	A	2.24E-02
Xylene	7,233,103	149,810	1,083,591		A	
o-Xylene	7,233,103	149,810	1,083,591	7.27E-07	A	3.94E-04

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Honolulu 8 No 2 FO

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	8,749	140,000	1,225	0.061	M	0.0374
NOX	8,749	140,000	1,225	0.171	A	0.1047
CO	8,749	140,000	1,225	0.0357	A	0.0219
VOC	8,749	140,000	1,225	0.00143	A	0.0009
PM-PRI	8,749	140,000	1,225	0.0236	A	0.0145
PM-FIL	8,749	140,000	1,225	0.0143	A	0.0088
PM-CON	8,749	140,000	1,225	0.00929	A	0.0057
PM10-PRI	8,749	140,000	1,225	0.0164	A	0.0100
PM10-FIL	8,749	140,000	1,225	0.00714	A	0.0044
PM25-PRI	8,749	140,000	1,225	0.0111	A	0.0068
PM25-FIL	8,749	140,000	1,225	0.00179	A	0.0011
Acetaldehyde	8,749	140,000	1,225		A	
Acrolein	8,749	140,000	1,225		A	
Antimony Compounds	8,749	140,000	1,225	3.75E-05	A	2.30E-05
Arsenic Compounds	8,749	140,000	1,225	4.00E-06	A	2.45E-06
Benzene	8,749	140,000	1,225	1.53E-06	A	9.36E-07
Beryllium Compounds	8,749	140,000	1,225	3.00E-06	A	1.84E-06
1,3-Butadiene	8,749	140,000	1,225		A	
Cadmium Compounds	8,749	140,000	1,225	3.00E-06	A	1.84E-06
Chromium Compounds	8,749	140,000	1,225	3.00E-06	A	1.84E-06
Cobalt Compounds	8,749	140,000	1,225	4.30E-05	A	2.63E-05
Ethylbenzene	8,749	140,000	1,225	4.54E-07	A	2.78E-07
Formaldehyde	8,749	140,000	1,225	4.36E-04	A	2.67E-04
Hydrochloric Acid	8,749	140,000	1,225		A	
Lead Compounds	8,749	140,000	1,225	9.00E-06	A	5.51E-06
Manganese Compounds	8,749	140,000	1,225	6.00E-06	A	3.67E-06
Mercury Compounds	8,749	140,000	1,225	3.00E-06	A	1.84E-06
Nickel Compounds	8,749	140,000	1,225	3.00E-06	A	1.84E-06
Naphthalene	8,749	140,000	1,225	8.07E-06	A	4.94E-06
Phosphorus	8,749	140,000	1,225	6.76E-05	A	4.14E-05
POM	8,749	140,000	1,225	9.29E-06	A	5.69E-06
Selenium Compounds	8,749	140,000	1,225	1.50E-05	A	9.19E-06
Toluene	8,749	140,000	1,225	4.43E-05	A	2.71E-05
Xylene	8,749	140,000	1,225		A	
o-Xylene	8,749	140,000	1,225	7.79E-07	A	4.77E-07

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Honolulu 8 Spec Used Oil

Pollutant	Annual Fuel Use (gal/yr)	Emission Factor (lb/10³ gal)	EF Ref	Annual Emissions (tons/yr)
SO2	2,511	9.4	A	0.01180
NOX	2,511	47	A	0.05901
CO	2,511	5	A	0.00628
VOC	2,511	0.76	A	0.00095
PM-PRI	2,511	5.27	A	0.00662
PM-FIL	2,511	3.77	A	0.00473
PM-CON	2,511	1.5	A	0.00188
PM10-PRI	2,511	4.18	A	0.00525
PM10-FIL	2,511	2.68	A	0.00336
PM25-PRI	2,511	3.46	A	0.00434
PM25-FIL	2,511	1.96	A	0.00246
Acetaldehyde	2,511		A	
Acrolein	2,511		A	
Antimony Compounds	2,511		A	
Arsenic Compounds	2,511	1.10E-01	A	1.38E-04
Benzene	2,511		A	
Beryllium Compounds	2,511		A	
1,3-Butadiene	2,511		A	
Cadmium Compounds	2,511	9.30E-03	A	1.17E-05
Chromium Compounds	2,511	2.00E-02	A	2.51E-05
Cobalt Compounds	2,511	2.10E-04	A	2.64E-07
Ethylbenzene	2,511		A	
Formaldehyde	2,511		A	
Hydrochloric Acid	2,511	3.30E-02	A	4.14E-05
Lead Compounds	2,511	5.50E-01	A	6.91E-04
Manganese Compounds	2,511	6.80E-02	A	8.54E-05
Mercury Compounds	2,511		A	
Nickel Compounds	2,511	1.10E-02	A	1.38E-05
Naphthalene	2,511		A	
Phosphorus	2,511		A	
POM	2,511		A	
Selenium Compounds	2,511		A	
Toluene	2,511		A	
Xylene	2,511		A	
o-Xylene	2,511		A	

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Honolulu 8 Propane

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	1,798	91,500	165	0.00371	M	0.00031
NOX	1,798	91,500	165	0.208	A	0.01711
CO	1,798	91,500	165	0.0350	A	0.00288
VOC	1,798	91,500	165	0.00546	A	0.00045
PM-PRI	1,798	91,500	165	0.0122	A	0.00100
PM-FIL	1,798	91,500	165	0.00656	A	0.00054
PM-CON	1,798	91,500	165	0.00559	A	0.00046
PM10-PRI	1,798	91,500	165	0.0122	A	0.00100
PM10-FIL	1,798	91,500	165	0.00656	A	0.00054
PM25-PRI	1,798	91,500	165	0.0122	A	0.00100
PM25-FIL	1,798	91,500	165	0.00656	A	0.00054
Acetaldehyde	1,798	91,500	165		A	
Acrolein	1,798	91,500	165		A	
Antimony Compounds	1,798	91,500	165		A	
Arsenic Compounds	1,798	91,500	165		A	
Benzene	1,798	91,500	165		A	
Beryllium Compounds	1,798	91,500	165		A	
1,3-Butadiene	1,798	91,500	165		A	
Cadmium Compounds	1,798	91,500	165		A	
Chromium Compounds	1,798	91,500	165		A	
Cobalt Compounds	1,798	91,500	165		A	
Ethylbenzene	1,798	91,500	165		A	
Formaldehyde	1,798	91,500	165		A	
Hydrochloric Acid	1,798	91,500	165		A	
Lead Compounds	1,798	91,500	165		A	
Manganese Compounds	1,798	91,500	165		A	
Mercury Compounds	1,798	91,500	165		A	
Nickel Compounds	1,798	91,500	165		A	
Naphthalene	1,798	91,500	165		A	
Phosphorus	1,798	91,500	165		A	
POM	1,798	91,500	165		A	
Selenium Compounds	1,798	91,500	165		A	
Toluene	1,798	91,500	165		A	
Xylene	1,798	91,500	165		A	
o-Xylene	1,798	91,500	165		A	

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Honolulu 8 Total

	Annual Emissions				
Pollutant	No 6 Fuel Oil (tons/yr)	No 2 Fuel Oil (tons/yr)	Spec Used Oil (tons/yr)	Propane (tons/yr)	Total (tons/yr)
SO2	250.9	0.0374	0.0118	0.0003	250.9
NOX	169.6	0.1047	0.0590	0.0171	169.8
CO	18.0	0.0219	0.0063	0.0029	18.0
VOC	2.7	0.0009	0.0010	0.0004	2.7
PM-PRI	31.6	0.0145	0.0066	0.0010	31.6
PM-FIL	26.2	0.0088	0.0047	0.0005	26.2
PM-CON	5.4	0.0057	0.0019	0.0005	5.4
PM10-PRI	24	0.0100	0.0052	0.0010	24.0
PM10-FIL	18.6	0.0044	0.0034	0.0005	18.6
PM25-PRI	19	0.0068	0.0043	0.0010	19.0
PM25-FIL	13.6	0.0011	0.0025	0.0005	13.6
Acetaldehyde					
Acrolein					
Antimony Compounds	1.90E-02	2.30E-05			1.90E-02
Arsenic Compounds	4.77E-03	2.45E-06	1.38E-04		4.91E-03
Benzene	7.73E-04	9.36E-07			7.74E-04
Beryllium Compounds	1.00E-04	1.84E-06			1.02E-04
1,3-Butadiene					
Cadmium Compounds	1.44E-03	1.84E-06	1.17E-05		1.45E-03
Chromium Compounds	3.05E-03	1.84E-06	2.51E-05		3.08E-03
Cobalt Compounds	2.17E-02	2.63E-05	2.64E-07		2.18E-02
Ethylbenzene	2.30E-04	2.78E-07			2.30E-04
Formaldehyde	2.20E-01	2.67E-04			2.21E-01
Hydrochloric Acid			4.14E-05		4.14E-05
Lead Compounds	5.45E-03	5.51E-06	6.91E-04		6.15E-03
Manganese Compounds	1.08E-02	3.67E-06	8.54E-05		1.09E-02
Mercury Compounds	4.08E-04	1.84E-06			4.10E-04
Nickel Compounds	3.05E-01	1.84E-06	1.38E-05		3.05E-01
Naphthalene	4.08E-03	4.94E-06			4.09E-03
Phosphorus	3.42E-02	4.14E-05			3.42E-02
POM	4.70E-03	5.69E-06			4.70E-03
Selenium Compounds	2.47E-03	9.19E-06			2.48E-03
Toluene	2.24E-02	2.71E-05			2.24E-02
Xylene					
o-Xylene	3.94E-04	4.77E-07			3.94E-04
Total HAPs					6.63E-01

Honolulu 9 No 6 FO

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	5,281,989	149,810	791,295	0.463	M	183.2
NOX	5,281,989	149,810	791,295	0.313	A	123.8
CO	5,281,989	149,810	791,295	0.0333	A	13.2
VOC	5,281,989	149,810	791,295	0.00507	A	2.0
PM-PRI	5,281,989	149,810	791,295	0.0583	A	23.1
PM-FIL	5,281,989	149,810	791,295	0.0483	A	19.1
PM-CON	5,281,989	149,810	791,295	0.0100	A	4.0
PM10-PRI	5,281,989	149,810	791,295	0.0443	A	17.5
PM10-FIL	5,281,989	149,810	791,295	0.0343	A	13.6
PM25-PRI	5,281,989	149,810	791,295	0.0351	A	13.9
PM25-FIL	5,281,989	149,810	791,295	0.0251	A	9.9
Acetaldehyde	5,281,989	149,810	791,295		A	
Acrolein	5,281,989	149,810	791,295		A	
Antimony Compounds	5,281,989	149,810	791,295	3.50E-05	A	1.38E-02
Arsenic Compounds	5,281,989	149,810	791,295	8.80E-06	A	3.48E-03
Benzene	5,281,989	149,810	791,295	1.43E-06	A	5.64E-04
Beryllium Compounds	5,281,989	149,810	791,295	1.85E-07	A	7.33E-05
1,3-Butadiene	5,281,989	149,810	791,295		A	
Cadmium Compounds	5,281,989	149,810	791,295	2.65E-06	A	1.05E-03
Chromium Compounds	5,281,989	149,810	791,295	5.63E-06	A	2.23E-03
Cobalt Compounds	5,281,989	149,810	791,295	4.01E-05	A	1.59E-02
Ethylbenzene	5,281,989	149,810	791,295	4.24E-07	A	1.68E-04
Formaldehyde	5,281,989	149,810	791,295	4.07E-04	A	1.61E-01
Hydrochloric Acid	5,281,989	149,810	791,295		A	
Lead Compounds	5,281,989	149,810	791,295	1.01E-05	A	3.98E-03
Manganese Compounds	5,281,989	149,810	791,295	2.00E-05	A	7.91E-03
Mercury Compounds	5,281,989	149,810	791,295	7.53E-07	A	2.98E-04
Nickel Compounds	5,281,989	149,810	791,295	5.63E-04	A	2.23E-01
Naphthalene	5,281,989	149,810	791,295	7.53E-06	A	2.98E-03
Phosphorus	5,281,989	149,810	791,295	6.31E-05	A	2.50E-02
POM	5,281,989	149,810	791,295	8.67E-06	A	3.43E-03
Selenium Compounds	5,281,989	149,810	791,295	4.55E-06	A	1.80E-03
Toluene	5,281,989	149,810	791,295	4.13E-05	A	1.64E-02
Xylene	5,281,989	149,810	791,295		A	
o-Xylene	5,281,989	149,810	791,295	7.27E-07	A	2.88E-04

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Honolulu 9 No 2 FO

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	2,885	140,000	404	0.061	M	0.0123
NOX	2,885	140,000	404	0.171	A	0.0345
CO	2,885	140,000	404	0.0357	A	0.0072
VOC	2,885	140,000	404	0.00143	A	0.0003
PM-PRI	2,885	140,000	404	0.0236	A	0.0048
PM-FIL	2,885	140,000	404	0.0143	A	0.0029
PM-CON	2,885	140,000	404	0.00929	A	0.0019
PM10-PRI	2,885	140,000	404	0.0164	A	0.0033
PM10-FIL	2,885	140,000	404	0.00714	A	0.0014
PM25-PRI	2,885	140,000	404	0.0111	A	0.0022
PM25-FIL	2,885	140,000	404	0.00179	A	0.0004
Acetaldehyde	2,885	140,000	404		A	
Acrolein	2,885	140,000	404		A	
Antimony Compounds	2,885	140,000	404	3.75E-05	A	7.57E-06
Arsenic Compounds	2,885	140,000	404	4.00E-06	A	8.08E-07
Benzene	2,885	140,000	404	1.53E-06	A	3.09E-07
Beryllium Compounds	2,885	140,000	404	3.00E-06	A	6.06E-07
1,3-Butadiene	2,885	140,000	404		A	
Cadmium Compounds	2,885	140,000	404	3.00E-06	A	6.06E-07
Chromium Compounds	2,885	140,000	404	3.00E-06	A	6.06E-07
Cobalt Compounds	2,885	140,000	404	4.30E-05	A	8.68E-06
Ethylbenzene	2,885	140,000	404	4.54E-07	A	9.17E-08
Formaldehyde	2,885	140,000	404	4.36E-04	A	8.80E-05
Hydrochloric Acid	2,885	140,000	404		A	
Lead Compounds	2,885	140,000	404	9.00E-06	A	1.82E-06
Manganese Compounds	2,885	140,000	404	6.00E-06	A	1.21E-06
Mercury Compounds	2,885	140,000	404	3.00E-06	A	6.06E-07
Nickel Compounds	2,885	140,000	404	3.00E-06	A	6.06E-07
Naphthalene	2,885	140,000	404	8.07E-06	A	1.63E-06
Phosphorus	2,885	140,000	404	6.76E-05	A	1.36E-05
POM	2,885	140,000	404	9.29E-06	A	1.88E-06
Selenium Compounds	2,885	140,000	404	1.50E-05	A	3.03E-06
Toluene	2,885	140,000	404	4.43E-05	A	8.94E-06
Xylene	2,885	140,000	404		A	
o-Xylene	2,885	140,000	404	7.79E-07	A	1.57E-07

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Honolulu 9 Spec Used Oil

Pollutant	Annual Fuel Use (gal/yr)	Emission Factor (lb/10³ gal)	EF Ref	Annual Emissions (tons/yr)
SO2	287	9.4	A	0.00135
NOX	287	47	A	0.00674
CO	287	5	A	0.00072
VOC	287	0.76	A	0.00011
PM-PRI	287	5.27	A	0.00076
PM-FIL	287	3.77	A	0.00054
PM-CON	287	1.5	A	0.00022
PM10-PRI	287	4.18	A	0.00060
PM10-FIL	287	2.68	A	0.00038
PM25-PRI	287	3.46	A	0.00050
PM25-FIL	287	1.96	A	0.00028
Acetaldehyde	287		A	
Acrolein	287		A	
Antimony Compounds	287		A	
Arsenic Compounds	287	1.10E-01	A	1.58E-05
Benzene	287		A	
Beryllium Compounds	287		A	
1,3-Butadiene	287		A	
Cadmium Compounds	287	9.30E-03	A	1.33E-06
Chromium Compounds	287	2.00E-02	A	2.87E-06
Cobalt Compounds	287	2.10E-04	A	3.01E-08
Ethylbenzene	287		A	
Formaldehyde	287		A	
Hydrochloric Acid	287	3.30E-02	A	4.74E-06
Lead Compounds	287	5.50E-01	A	7.89E-05
Manganese Compounds	287	6.80E-02	A	9.76E-06
Mercury Compounds	287		A	
Nickel Compounds	287	1.10E-02	A	1.58E-06
Naphthalene	287		A	
Phosphorus	287		A	
POM	287		A	
Selenium Compounds	287		A	
Toluene	287		A	
Xylene	287		A	
o-Xylene	287		A	

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Honolulu 9 Propane

Pollutant	Annual Fuel Use (gal/yr)	Fuel Heat Content (Btu/gal)	Annual Fuel Use (MMBtu/yr)	Emission Factor (lb/MMBtu)	EF Ref	Annual Emissions (tons/yr)
SO2	1,387	91,500	127	0.00371	M	0.00024
NOX	1,387	91,500	127	0.208	A	0.01320
CO	1,387	91,500	127	0.0350	A	0.00222
VOC	1,387	91,500	127	0.00546	A	0.00035
PM-PRI	1,387	91,500	127	0.0122	A	0.00077
PM-FIL	1,387	91,500	127	0.00656	A	0.00042
PM-CON	1,387	91,500	127	0.00559	A	0.00035
PM10-PRI	1,387	91,500	127	0.0122	A	0.00077
PM10-FIL	1,387	91,500	127	0.00656	A	0.00042
PM25-PRI	1,387	91,500	127	0.0122	A	0.00077
PM25-FIL	1,387	91,500	127	0.00656	A	0.00042
Acetaldehyde	1,387	91,500	127		A	
Acrolein	1,387	91,500	127		A	
Antimony Compounds	1,387	91,500	127		A	
Arsenic Compounds	1,387	91,500	127		A	
Benzene	1,387	91,500	127		A	
Beryllium Compounds	1,387	91,500	127		A	
1,3-Butadiene	1,387	91,500	127		A	
Cadmium Compounds	1,387	91,500	127		A	
Chromium Compounds	1,387	91,500	127		A	
Cobalt Compounds	1,387	91,500	127		A	
Ethylbenzene	1,387	91,500	127		A	
Formaldehyde	1,387	91,500	127		A	
Hydrochloric Acid	1,387	91,500	127		A	
Lead Compounds	1,387	91,500	127		A	
Manganese Compounds	1,387	91,500	127		A	
Mercury Compounds	1,387	91,500	127		A	
Nickel Compounds	1,387	91,500	127		A	
Naphthalene	1,387	91,500	127		A	
Phosphorus	1,387	91,500	127		A	
POM	1,387	91,500	127		A	
Selenium Compounds	1,387	91,500	127		A	
Toluene	1,387	91,500	127		A	
Xylene	1,387	91,500	127		A	
o-Xylene	1,387	91,500	127		A	

Notes:
M - Mass Balance
P - Permit Limit
A - AP-42 Emission Factor
S - Stack Test Data

Honolulu 9 Total

	Annual Emissions				
Pollutant	No 6 Fuel Oil (tons/yr)	No 2 Fuel Oil (tons/yr)	Spec Used Oil (tons/yr)	Propane (tons/yr)	Total (tons/yr)
SO2	183.2	0.0123	0.0013	0.0002	183.2
NOX	123.8	0.0345	0.0067	0.0132	123.9
CO	13.2	0.0072	0.0007	0.0022	13.2
VOC	2.0	0.0003	0.0001	0.0003	2.0
PM-PRI	23.1	0.0048	0.0008	0.0008	23.1
PM-FIL	19.1	0.0029	0.0005	0.0004	19.1
PM-CON	4.0	0.0019	0.0002	0.0004	4.0
PM10-PRI	17.5	0.0033	0.0006	0.0008	17.5
PM10-FIL	13.6	0.0014	0.0004	0.0004	13.6
PM25-PRI	13.9	0.0022	0.0005	0.0008	13.9
PM25-FIL	9.9	0.0004	0.0003	0.0004	9.9
Acetaldehyde					
Acrolein					
Antimony Compounds	1.38E-02	7.57E-06			1.39E-02
Arsenic Compounds	3.48E-03	8.08E-07	1.58E-05		3.50E-03
Benzene	5.64E-04	3.09E-07			5.65E-04
Beryllium Compounds	7.33E-05	6.06E-07			7.39E-05
1,3-Butadiene					
Cadmium Compounds	1.05E-03	6.06E-07	1.33E-06		1.05E-03
Chromium Compounds	2.23E-03	6.06E-07	2.87E-06		2.23E-03
Cobalt Compounds	1.59E-02	8.68E-06	3.01E-08		1.59E-02
Ethylbenzene	1.68E-04	9.17E-08			1.68E-04
Formaldehyde	1.61E-01	8.80E-05			1.61E-01
Hydrochloric Acid			4.74E-06		4.74E-06
Lead Compounds	3.98E-03	1.82E-06	7.89E-05		4.06E-03
Manganese Compounds	7.91E-03	1.21E-06	9.76E-06		7.92E-03
Mercury Compounds	2.98E-04	6.06E-07			2.99E-04
Nickel Compounds	2.23E-01	6.06E-07	1.58E-06		2.23E-01
Naphthalene	2.98E-03	1.63E-06			2.98E-03
Phosphorus	2.50E-02	1.36E-05			2.50E-02
POM	3.43E-03	1.88E-06			3.43E-03
Selenium Compounds	1.80E-03	3.03E-06			1.80E-03
Toluene	1.64E-02	8.94E-06			1.64E-02
Xylene					
o-Xylene	2.88E-04	1.57E-07			2.88E-04
Total HAPs					4.83E-01

Summary

Pollutant	Annual Emissions		
	Honolulu 8	Honolulu 9	Total
SO2	250.9	183.2	434.1
NOX	169.8	123.9	293.7
CO	18.0	13.2	31.2
VOC	2.7	2.0	4.7
PM-PRI	31.6	23.1	54.7
PM-FIL	26.2	19.1	45.3
PM-CON	5.4	4.0	9.4
PM10-PRI	24.0	17.5	41.5
PM10-FIL	18.6	13.6	32.2
PM25-PRI	19.0	13.9	32.9
PM25-FIL	13.6	9.9	23.5
Acetaldehyde	0.0000	0.0000	
Acrolein	0.0000	0.0000	
Antimony Compounds	0.0190	0.0139	
Arsenic Compounds	0.0049	0.0035	
Benzene	0.0008	0.0006	
Beryllium Compounds	0.0001	0.0001	
1,3-Butadiene	0.0000	0.0000	
Cadmium Compounds	0.0015	0.0011	
Chromium Compounds	0.0031	0.0022	
Cobalt Compounds	0.0218	0.0159	
Ethylbenzene	0.0002	0.0002	
Formaldehyde	0.2206	0.1610	
Hydrochloric Acid	0.0000	0.0000	
Lead Compounds	0.0062	0.0041	
Manganese Compounds	0.0109	0.0079	
Mercury Compounds	0.0004	0.0003	
Nickel Compounds	0.3052	0.2229	
Naphthalene	0.0041	0.0030	
Phosphorus	0.0342	0.0250	
POM	0.0047	0.0034	
Selenium Compounds	0.0025	0.0018	
Toluene	0.0224	0.0164	
Xylene	0.0000	0.0000	
o-Xylene	0.0004	0.0003	
Total HAPS	7.00E-01	5.00E-01	

bc (w/o enc): D. Giovanni

bc (w/enc): G. Murata
Q. Komori
J. Clary (JCA)
Environmental Compliance File: Date & Title

CA-IR-423

Ref: June 2007 Update, HECO T-6, pages 3 to 6; Attachments 3, 4, 5 and 6 (Clean Water Act 316(b) Expenses).

Please provide the following regarding this newly proposed test year expense element:

a. Explain and provide documentation supporting the basis for HECO decisions to defer incurred CWA Section 316b costs as potential capital projects, as noted on page 4.

b. Provide a breakdown of the deferred costs in Attachment 3, by month and by RA for all periods shown.

c. Provide complete copies of all studies, reports, analyses and other documents prepared or relied upon in connection with the April 3, 2007 "accounting decision [that] was made by HECO to transfer the accumulated Section 316(b) costs…"

d. Provide the amounts of projected labor costs in the HECO 2005 test year that were removed from ratemaking expense and treated as capitalized charges to PEWON work orders (if any).

e. Provide copies of 2005 test year workpapers or IR responses supportive of any affirmative response to part (d) of this information request.

f. Provide the amounts of projected labor costs in the HECO 2007 test year that were removed from ratemaking expense and treated as capitalized charges to PEWON work orders (if any), with references to where such amounts can be observed in the Company's response to CA-IR-1.

g. Provide a copy of the 2005 test year RA=PJW non-labor expense support documentation as supplied in response to CA-IR-2 in Docket No. 04-0113, indicating costs budgeted to expense indicators as well as any projected 2005 capital or other non-expensed projects (such as the 316b projects listed in Attachment 3).

h. Provide a comparative analysis of RA=PJW actual monthly non-labor expenses by expense element in 2005, 2006 and 2007, to-date, in relation to the PJW non-labor expenses approved in the 2005 test year.

i. Provide supporting documentation for each amount shown on Attachment 4, with references into CA-IR-1 and CA-IR-2 schedules where such amounts were reflected, as applicable.

j. Provide copies of documentation supportive of each listed 2007 cost estimate in Attachment 5, including but not limited to requests for proposals, contracts, work orders and correspondence with each of the listed vendors.

k. Provide a monthly breakdown of each of the cost line items in Attachment 6 (except 316(b) incurred 1/07-4/07) for all years by expense element, indicating each amounts for which a contract or other firm commitments to spend has been secured.

l. Provide a monthly breakdown of actual HECO charges for CWA Section 316(b) compliance activities by RA, Indicator (NP, NE, etc.) and expense element through June 2007, indicating how such amounts can be reconciled to Attachment 3 and Attachment 4.

HECO Response:

a. HECO's decision to defer incurred CWA Section 316b costs as potential capital projects was based on information contained in EPA's published final regulations. When the *"Final Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities; Federal Register Vol. 69, No 131, 7/9/04"* were published in 2004, they contained a description of the "applicable [compliance] technology" and associated cost estimate for each specific facility that fell under this regulation. EPA's candidate technologies were modeled by EPA and the technology deemed to be the most appropriate for each facility was identified as the applicable technology. These applicable technologies and cost estimates for Kahe, Waiau, and Honolulu were published in the final regulations under "*Appendix A: Costs considered by EPA in Establishing Performance Standards.*" Attachment 1 to this response are excerpts from EPA's final rule listing the proposed technologies and associated cost estimates for HECO's Kahe, Waiau, and Honolulu generating stations.[1]

The proposed technologies and cost impacts for the Kahe, Waiau, and Honolulu facilities were obtained using the three-step process described below (the indicated page numbers denote the page numbers printed on the excerpt and the appendices referred to are the appendices in Attachment 1 to this response):

Step 1: Obtain the "Facility ID" from Appendix B on pages 41680 and 41681.

Kahe – AUTO305

Waiau – DUT1116

Honolulu – DUT1145

[1] *Final Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities;* Federal Register Vol. 69, No. 131, 7/9/04

Step 2: Using the Facility ID above, locate each facility in the spreadsheets on pages 41670, 41671, and 41674. The description of each cost component summarized in response to CA-IR-423, subpart a., is provided in the column headings on page 41670 and 41674.

Step 3: A description of the applicable technologies for Kahe, Waiau and Honolulu can be obtained from the "EPA Modeled Technology Code" in Column 12 on pages 41671 (Code #14 for Kahe) and 41674 (Code #11 for Waiau and Code #12 for Honolulu). Descriptions of the applicable technologies are provided in Table 9-1, "Technology Codes and Descriptions" on page 41646.

The resulting technology descriptions and associated costs for Kahe, Waiau and Honolulu facilities are summarized below:

Kahe Power Plant

Relocation of an existing intake to a submerged offshore location with passive fine mesh screen inlet with a mesh width of 0.76 mm.

- $42,822,242 Capital Cost
- $146,012 Annual Baseline O&M
- $281,593 Annual Post Construction O&M
- $49,751,104 Loss Revenue from Construction Downtime
- $4,326,108 Pilot Study Costs

Waiau Power Plant

Addition of dual-entry, single exit traveling screens to a shoreline intake system.

- $2,886,459 Capital Cost
- $69,804 Annual Baseline O&M

- $84,921 Annual Post Construction O&M
- $291,604 Pilot Study Costs

Honolulu Power Plant

Addition of passive mesh screen system (cylindrical wedgewire) near shoreline with a mesh width of 0.76 mm.

- $2,702,979 Capital Cost
- $38,035 Annual Baseline O&M
- $57,101 Annual Post Construction O&M
- $1,565,614 Loss Revenue from Construction Downtime
- $273,068 Pilot Study Costs

Given the significant cost potentially associated for compliance with Clean Water Act Section 316(b), HECO established a "PEWON" account to capture the costs for this project in accordance with the Section 316(b) schedule. On December 5, 2005, an "Authorization for Preliminary Engineering Workorder Charges in Excess of $20K" was requested and approved based on a total estimate of $1,066,500 (equal to $355,500 each for Kahe, Waiau, and Honolulu Power Plants). A copy of the preliminary engineering work order is provided as Attachment 2 to this response. The $355,500 forecast for each facility was broken down as follows:

1) Proposal for Information Collection (PIC)	$55,500
2) Technology Assessment	$25,000
3) Impingement & Entrainment Monitoring	$125,000
4) Comprehensive Demonstration Study	$150,000
Total:	$355,500

b. Breakdowns of the deferred costs in HECO T-6, June 2007 Update, Attachment 3, Costs Incurred for 316(b) Work for the period 2005-April 2007, by month and by RA are provided as Attachments 3, 4, and 5 to this response for Honolulu; Waiau; and Kahe, respectively.

c. The basis for the accounting decision that was made by HECO to transfer the accumulated Section 316(b) costs from the PEWON account is described in Attachment 6 to this response, HECO Interoffice Correspondence (IOC), from Patsy Nanbu to Tayne Sekimura, dated April 3, 2007.

d. There were no projected labor costs in the HECO 2005 test year that were removed from ratemaking expense and treated as capitalized charges to CWA Section 316(b) PEWON work orders

e. Not Applicable.

f. Labor estimates relating to the CWA Section 316(b) PEWON work orders totaled $23,004 as shown in Attachment 7 to this response. These estimates were treated as capitalized expenses and were not included in the O&M labor estimates provided in response to CA-IR-1.

g. A copy of the 2005 test year RA=PJW non-labor expense support documentation as supplied in response to CA-IR-2 in Docket No. 04-0113, is provided in Attachment 8 to this response. A review of Attachment 8, page 11, shows that $75,000 was included for each of the three HECO power plants (the line items identified as "NPDES 316(b) Study" for locations HST, KST, and WST). The $75,000 per power plant estimate, or $225,000 total, on pages 3 and 11 of Attachment 8 to this response was based on an EPRI proposal (Attachment 9 to this response) for $176,000, plus an additional budgetary estimate of $49,000 for the collection of baseline data. After realizing the potential impact of 316(b) on capital expenses, a PEWON account was established in December 2005 as discussed in subpart a. above.

h. Please refer to Attachments 3, 4 and 5 to this response, discussed in subpart b. above, for actual monthly non-labor expenses by expense element in 2005, 2006 and January through April, 2007 for PJW. The table below compares 2005 test year non-labor estimates relating to 316(b) with actual expenses for 2005, 2006, and January through April 2007 for expense element 501. Except for 2005, actual annual expenditures relating to 316(b) are significantly higher than the 2005 TY estimate.

Year	Honolulu	Waiau	Kahe	Total
2005 TY	$75,000	$75,000	$75,000	$225,000
2005 Actual	$56,850	$56,782	$57,335	$170,967
2006 Actual	$98,733	$112,240	$101,724	$312,697
2007 Jan-Apr	$97,095	$104,574	$100,037	$301,706

i. The amounts in the June 2007 Update, HECO T-6, Attachment 4, reflect actual expenses from January, 2007 through April 2007. At the time responses to CA-IR-1 and CA-IR-2 were prepared, the amounts in the June 2007 Update, HECO T-6, Attachment 4 were in PEWON, and therefore did not show up as Other Production O&M expenses. Supporting information for each activity listed in the June 2007 Update, HECO T-6, Attachment 4 is provided as referenced below.

- Labor expenses (150, 151, Overheads) – Please refer to page 3 in Attachments 3 and 5 and page 4 in Attachment 4 to this response for a monthly breakdown of expenses.
- Outside Services (501) – In addition to monthly breakdowns on page 3 in Attachments 3 and 5 and page 4 in Attachment 4 to this response, please reference the Tenera Cost Proposal in Attachment 10 to this response, which served as the basis for the ongoing studies relating to 316(b). The Tenera Cost Proposal provided several options that

allowed the study to shift between sampling alternatives based on sampling results. Referring to the options on page 2 in Attachment 10 to this response, the entrainment portion of the monitoring plan HECO submitted to DOH/EPA included weekly pump sampling for entrainment monitoring (Option 1). Before the start of sampling it was further determined that Option 3, weekly net sampling was more effective than pump sampling based on the design of the seawater intake structures. After five months of weekly net sampling, monitoring switched to a bi-weekly cycle (Option 4) based on the results of the weekly sampling. The impingement sampling frequency has been, and will continue, to be weekly.

- Travel/Lodging and Meals (520 and 521) – Expenses in this category are related to travel expenses for a HECO Senior Environmental Scientist to attend an EPRI Workshop that was held in March, 2007. Attachment 11 to this response describes the workshop and Attachment 12 to this response is a breakdown of the travel, lodge and meal expenses.

j. Copies of documents supportive of each activity listed in the June 2007 Update, HECO T-6, Attachment 5 are provided as referenced below. Please note a reduction in BPJE expenses as explained below.

- 316(b) monitoring – Kahe, Waiau, Honolulu ($130,000).
    1. Reference Attachment 13 to this response, Tenera Environmental letter dated April 4, 2007. The $130,000 estimate is discussed in the 2nd paragraph of the letter.

- Extended monitoring – Kahe, Waiau, Honolulu ($388, 575)
    1. Reference Attachment 13 to this response, Tenera Environmental letter dated April 4, 2007. As noted in Attachment 5, the $388,575 estimate was based on

8/12 of the total amount of $582,862. The breakdown of the $583,000 amount is provided on page 2 of the letter.

2. Reference Attachment 14 to this response, HECO Work Authorization Amendment dated June 21, 2007.
3. Reference Attachment 15 to this response, Amendment No. 1 to Authorization No. 01 which reflects the change to the Master Contract with Tenera Environmental.

- Closed Cycle Cooling Evaluation ($6,000)
    1. Reference Attachment 16 to this response, EPRI Solutions e-mail from Cynthia Toth to Kirk Tomita dated 7/20/06, quoting a fixed price of $5,917.
    2. Reference Attachment 17 to this response, Proposal for: California 316(b) Project – ESI Project No. 06-00787 for Kahe Station.
    3. Reference Attachment 18 to this response, Billable Services Agreement No. 542-06.
- Best Professional Judgment Evaluation (BPJE) ($102,000)
    1. Reference Attachment 19 to this response, Supplement Project Agreement and Exhibit 1 to Supplemental Project Agreement TC/CF 011950-11156 (Project ID No. 066063)
    2. Reference Attachment 20 to this response, Proposal to Prepare the 316(b) BPJ Compliance Support Services for Hawaiian Electric Power Company's Honolulu, Kahe and Waiau Generating Stations. Total expenses based on the proposal amounted to $203,500 ($190,000 for Projects 1 & 2, and $13,500 for optional meetings). As shown in Attachment 14 to this response, EPRI Tailored Collaboration funding was approved in June with the result of reducing HECO's

expenses to half of the amount in the proposal, or approximately $102,000 ($88,200 for Projects 1 & 2 and $13,500 for optional meetings).

3. Reference Attachment 21 to this response, Work Authorization No. 01 – CWA Section 316(b) Support Services.

k. A monthly breakdown of the cost line items in T-6, June 2007 Update, Attachment 6 is provided as Attachment 22 to this response. Commitments to spend include all expenses shown for 2007, and "Continue IM&E Eval" expenses from January through April, 2008. All remaining expense estimates from May through December 2008, and for all of 2009, are estimates only.

l. Please refer to response in subpart b. above for the breakdown of costs incurred from 2005 - April 2007 showing actual HECO charges for CWA Section 316(b) compliance activities. The 2005 - April 2007 amounts shown in Attachments 3 and 4, and replicated in subpart b. above for comparison purposes, represent costs that were transferred to the Power Supply clearing account. The May 2007 & June 2007 amounts were charged to O&M expense in accordance with the accounting decision discussed in subpart c. above. A breakdown of the costs incurred for 316(b) Work for the period May-June 2007, by month and by RA, is provided as Attachment 23 to this response.

The data in Appendix A is keyed to both a facility name and survey ID number. Facilities should be able to determine their ID number from the survey they submitted to EPA during the rule development process.

Step 1: Determine which technology EPA modeled as the most appropriate compliance technology for your facility (§ 125.94(a)(5)(i)(A)). To do this, use the code in column 12 of Appendix A to look up the modeled technology in Table 9 –1 below.

TABLE 9–1.—TECHNOLOGY CODES AND DESCRIPTIONS

Technology codes	Technology description
1	Addition of fish handling and return system to an existing traveling screen system.
2	Addition of fine-mesh screens to an existing traveling screen system.
3	Addition of a new, larger intake with fine-mesh and fish handling and return system in front of an existing intake system.
4	Addition of passive fine-mesh screen system (cylindrical wedgewire) near shoreline with mesh width of 1.75 mm.
5	Addition of a fish net barrier system.
6	Addition of an aquatic filter barrier system.
7	Relocation of an existing intake to a submerged offshore location with passive fine-mesh screen inlet with mesh width of 1.75 mm.
8	Addition of a velocity cap inlet to an existing offshore intake.
9	Addition of passive fine-mesh screen to an existing offshore intake with mesh width of 1.75 mm.
Column 12	
10	[Module 10 not used].
Waiau 11	Addition of dual-entry, single-exit traveling screens (with fine-mesh) to a shoreline intake system.
Honolulu 12	Addition of passive fine-mesh screen system (cylindrical wedgewire) near shoreline with mesh width of 0.76 mm.
13	Addition of passive fine-mesh screen to an existing offshore intake with mesh width of 0.76 mm.
Kahe 14	Relocation of an existing intake to a submerged offshore location with passive fine-mesh screen inlet with mesh width of 0.76 mm.

Step 2: Using EPA 's costing equations, calculate the annualized capital and net operation and maintenance costs for a facility with your design flow using this technology (§ 125.94(a)(5)(i)(B)). To do this, you should use the following formula, which is derived from the results of EPA 's costing equations for a facility like yours using the selected technology:

$$y_f = y_{epa} + m * (x_f - x_{epa}), (1)$$

Where:

y_f = annualized capital and net O&M costs using actual facility design intake flow,
x_f = actual facility design intake flow (in gallons per minute),
x_{epa} = EPA assumed facility design intake flow (in gallons per minute) (column 3),
y_{epa} = Annualized capital and net O&M costs using EPA design intake flow (column 7),and
m = design flow adjustment slope (column 13).

Rather than providing the detailed costing equations that EPA used to calculate annualized capital and net O&M costs for facilities to use each of the 14 modeled technologies, EPA has provided the simplified formula above, which collapses the results of those equations for the particular facility and technology into a single result (y_{epa}) and then allows the facility to adjust this result to reflect its actual design intake flow, using a technology specific slope for a facility like yours that is derived from the costing equations. This allows facilities to perform the flow adjustment required by § 125.94(a)(5)(i)(B) in a straightforward and transparent manner. Facilities, Directors, or members of the public who wish to review the detailed costing equations should consult the Technical Development Document, Chapter 3.

EPA has provided some additional information in Appendix A, beyond that which is needed to perform the calculations in § 125.95(a)(5)(ii), to facilitate comparison of the results obtained using formula 1 to the detailed costing equations in the TDD, for those who wish to do so. EPA does not expect facilities or permit writers to do this, and has in fact provided the simplified formula to preclude the need for doing so, but is providing the additional information to increase transparency. Thus, for informational purposes, the total capital cost (not annualized), baseline O&M cost, and post construction O&M cost from which the annualized capital and net O&M costs using EPA design intake flow (y_{epa} in column 7) are derived are listed separately in columns 4 through 6. To calculate y_{epa} EPA annualized the total capital cost using a 7 percent discount rate and 10 year amortization period, and added the result to the difference between the post construction O&M costs and the baseline O&M costs.

Note that some entries in Appendix A have NA indicated for the EPA assumed design intake flow in column 2. These are facilities for which EPA projected that they would already meet otherwise applicable performance standards based on existing technologies and measures. EPA projected zero compliance costs for these facilities, irrespective of design intake flow, so no flow adjustment is needed. These facilities should use $0 as their value for the costs considered by EPA for a like facility in establishing the applicable performance standards. EPA recognizes that these facilities will still incur permitting and monitoring costs, but these are not included in the cost comparison for the reasons stated above.

Step 3: Determine the annualized net revenue loss associated with net construction downtime that EPA modeled for the facility to install the technology (§ 125.94(a)(5)(i)(C)) and the annualized pilot study costs that EPA modeled for the facility to test and optimize the technology (§ 125.94(a)(5)(i)(D)). The sum of these two figures is listed in column 10. For informational purposes, the total (not annualized) net revenue losses from construction downtime, and total (not annualized) pilot study costs are listed separately in columns 8 and 9. These two figures were annualized using a 7 percent discount rate and 30 year amortization period and the results added together to get the annualized facility downtime and pilot study costs in column 10.

Step 4: Add the annualized capital and O&M costs using actual facility design intake flow (y_f from step 2), and the annualized facility downtime and pilot study costs (column 10 from step 3) to get the preliminary costs considered by EPA for a facility like yours (§ 125.94(a)(5)(i)(E)).

Step 5: Determine which performance standards in § 125.94(b)(1) and (2) (i.e., impingement mortality only, or impingement mortality and entrainment) are applicable to your facility, and compare these to the performance standards on which EPA 's cost estimates are based, listed in column 11 (§ 125.94(a)(5)(i)(F)). If the applicable performance standards and those on which EPA 's cost estimates are based are the same, then the preliminary costs considered by EPA for a facility like yours are the final costs considered by EPA for a facility like yours. If only the impingement mortality performance standards are applicable to your facility, but EPA based its cost estimates on

Facility ID	Intake ID	EPA assumed design intake flow, gpm (X_{epa}) ($)	Capital cost ($)	Baseline O&M annual cost ($)	Post construction O&M annual cost ($)	Annualized capital[3] + net O&M using EPA design intake flow[2] (y_{epa}) ($)	Net revenue losses from net construction downtime ($)	Pilot study costs ($)	Annualized downtime and pilot study costs[2,4] ($)	Performance standards on which EPA cost estimates are based	EPA modeled technology code	Design flow adjustment slope (m)[1]
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9	Column 10	Column 11	Column 12	Column 13
AUT0001		401,881	322,884	699,866	795,393	141,498				I&E	2	0.8639
AUT0002		549,533	5,750,259	68,489	104,063	854,282	6,650,155	290,459	559,082	I&E	12	3.6581
AUT0004		239,107	528,427	30,725	104,458	148,969				I	1	1.1604
AUT0011		453,758	967,675	55,545	193,660	275,890				I	1	1.1604
AUT0012		2,018,917	48,835,329	360,813	989,876	7,582,115	110,716,357	4,933,578	9,315,779	I&E	12	3.6581
AUT0014		572,383	2,732,729	91,057	110,893	408,915		276,073	22,022	I&E	11	0.7352
AUT0015		1,296,872	510,784		134,070	206,794				I	5	0.1286
AUT0016		301,127	41,613		28,195	34,120				I	5	0.1286
AUT0019		848,784	11,094,343	271,045	994,876	2,303,416				I	1	1.1604
AUT0020		207,514	1,517,779	34,859	42,089	223,327		153,333	12,231	I&E	11	0.7352
AUT0021		267,138	1,187,727	65,395	263,140	366,851		150,000	11,965	I&E	2	0.8639
AUT0024		639,702	72,402		47,164	57,472				I	5	0.1286
AUT0027		404,214	2,362,864	147,563	532,881	721,737				I	1	1.1604
AUT0044		457,869	183,653		57,997	84,145				I	5	0.1286
AUT0049		820,866	6,080,054	196,361	797,241	1,466,543		204,745	16,332	I&E	2	0.8639
AUT0051		348,052	11,832,011	17,181	50,842	1,718,273				I	4	2.5787
AUT0053		147,762	454,296	27,346	108,078	145,413				I&E	2	0.8639
AUT0057		56,391	271,166	19,811	65,525	84,322				I	1	1.1604
AUT0058		624,376	8,582,766	68,231	225,908	1,379,670	7,092,806	867,072	640,749	I&E	12	3.6581
AUT0064		553,145	3,039,302	195,656	695,636	932,709				I	1	1.1604
AUT0066		65,571	2,006,184	80,531	63,685	268,790	23,985,660	150,000	1,944,883	I&E	4	2.5787
AUT0078		288,792	5,683,876	267,577	1,083,987	1,625,667		574,212	45,804	I&E	2	0.8639
AUT0084		2,100,000	2,976,122	3,003,550	3,318,577	738,760		150,331	11,992	I&E	2	0.8639
AUT0085		975,261	23,279,870	341,127	452,608	3,426,011	52,842,026	2,351,844	4,445,953	I&E	4	2.5787
AUT0092		2,786,349	929,777		269,122	401,501				I	5	0.1286
AUT0095		67,369	55,826	120,772	140,422	27,598				I&E	2	0.8639
AUT0106		325,449	1,104,684	55,757	223,858	325,383		150,000	11,965	I&E	2	0.8639
AUT0110		551,114	6,445,617	70,141	104,066	951,636	5,297,741	651,167	478,869	I&E	12	3.6581
AUT0120		207,333	2,085,862	55,736	225,656	466,900		210,724	16,809	I&E	2	0.8639
AUT0123		62,226	106,975	7,021	20,122	28,333				I	1	1.1604
AUT0127		104,672	573,136	34,651	118,506	165,457				I	1	1.1604
AUT0130		929,723	8,127,384	402,025	1,628,672	2,383,804		821,067	65,496	I&E	2	0.8639
AUT0131		492,987	3,299,931	195,321	694,407	968,921				I	1	1.1604
AUT0134		99,252	3,334,593	8,170	35,218	501,819	238,035		19,182	I	3	3.4562
AUT0137		401,222	1,916,441	117,385	475,099	630,572		193,608	15,444	I&E	2	0.8639
AUT0139		369,074	117,095		49,945	66,617				I	5	0.1286
AUT0142		407,669	9,461,494	66,798	78,036	1,358,342	3,421,735	955,845	351,992	I&E	14	6.9559
AUT0143		289,294	971,645	50,004	200,412	288,748		150,000	11,965	I&E	2	0.8639
AUT0146		213,207	1,618,126	88,506	313,588	455,467				I	1	1.1604
AUT0148		1,036,476	12,443,192		288,984	2,060,615				I&E	9	5.973
AUT0149		848,079	109,389		58,838	74,413				I	5	0.1286
AUT0151		482,911	1,465,485	95,774	340,264	453,142				I	1	1.1604
AUT0161		555,680	1,600,167	101,254	360,434	487,008				I	1	1.1604
AUT0168		329,758	5,156,763	39,196	51,388	746,399	492,266	260,480	60,448	I&E	12	3.6581
AUT0171		1,189,016	14,989,478	120,512	398,517	2,412,170	15,890,363		1,280,547	I&E	7	2.504
AUT0174		1,341,997	934,469	1,387,449	1,537,156	282,755		150,000	11,965	I&E	2	0.8639
AUT0175		258,008	2,505,868	134,658	484,461	706,582				I	1	1.1604
AUT0176		1,652,395	6,892,691	425,370	1,533,553	2,089,548				I	1	1.1604
AUT0183		118,504	196,689	7,303	21,121	41,823				I	1	1.1604
AUT0185		810,911	97,503		56,756	70,638				I	5	0.1286
AUT0187		1,242,691	257,332		107,659	144,297				I	5	0.1286
AUT0190		511,950	27,779,896	616,589	191,870	3,530,513				I&E	9	5.973
AUT0191		692,335	19,255,865	184,161	66,491	2,623,932				I&E	9	5.973

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AUT0192		359,686	959,625	71,963	253,183	317,849			264,234	I	1	1.1604
AUT0193		1,006,084	19,112,665	90,728	323,635	2,954,121	3,278,888			I	3	3.4562
AUT0196		230,120	374,975		10,672	64,060				I	8	0.3315
AUT0197		407,061	4,773,876	248,548	891,410	1,322,554				I	1	1.1604
AUT0202		2,080,399	106,025,028	477,625	769,048	15,387,001				I&E	9	5.973
AUT0203		1,083,174	4,847,332	232,706	851,244	1,308,689				I	1	1.1604
AUT0205		313,218	720,557	37,147	127,449	192,893				I&E	1	1.1604
AUT0208		220,683	3,140,556	27,181	51,205	471,169	3,544,915		285,672	I&E	4	2.5787
AUT0222		156,464	299,274		9,554	52,164				I	8	0.3315
AUT0227		82,468	523,999	30,107	102,249	146,748				I	1	1.1604
AUT0228		147,594	837,743	41,023	163,811	242,064				I&E	2	0.8639
AUT0229		483,349	1,784,794	87,496	391,634	558,253				I&E	2	0.8639
AUT0238		376,148	757,400	51,856	180,342	236,323				I	1	1.1604
AUT0242		1,113,045	8,239,161	291,327	1,039,947	1,921,691				I	1	1.1604
AUT0244		49,980	426,844	22,868	76,413	114,318				I	1	1.1604
AUT0245		491,302	1,459,999	50,879	61,192	218,185		150,000	11,965	I&E	11	0.7352
AUT0254		145,838	353,928	22,339	74,527	102,580				I	1	1.1604
AUT0255		194,919	258,805		10,232	47,080				I	8	0.3315
AUT0261		201,229	943,433	57,335	230,290	307,278		150,000	11,965	I&E	2	0.8639
AUT0264		840,000	21,384,690	1,502,211	185,672	1,728,160	43,525,468	2,160,384	3,679,892	I&E	12	3.6581
AUT0266		653,994	139,380	307,951	351,075	62,969				I&E	2	0.8639
AUT0268		712,677	2,998,753	114,173	417,470	730,253				I	1	1.1604
AUT0273		173,689	994,534	52,039	208,703	298,263		150,000	11,965	I&E	2	0.8639
AUT0277		88,831	1,192,106	45,779	51,021	174,971	186,802		15,054	I&E	4	2.5787
AUT0278		1,642,492	6,410,550	771,895	257,586	398,409		647,624	51,660	I&E	11	0.7352
AUT0284		728,495	3,743,165	208,370	742,487	1,067,059				I	1	1.1604
AUT0292		556,596	2,227,636	99,379	350,087	567,874				I	1	1.1604
AUT0295		359,098	3,584,905	53,365	114,232	571,276	5,005,800		403,399	I&E	4	2.5787
AUT0297		184,293	1,172,223	63,592	255,790	359,096		150,000	11,965	I&E	2	0.8639
AUT0298		897,819	100,769		61,625	75,972				I	5	0.1286
AUT0299		864,873	9,012,107	150,709	127,282	1,259,694	15,622,548	227,612	1,277,121	I&E	12	3.6581
AUT0302		71,413	91,562	6,933	19,813	25,916				I	1	1.1604
AUT0305		762,197	42,822,242	146,012	281,593	6,232,505	49,751,104	4,326,108	4,354,352	I&E	14	6.9559
AUT0308		394,361	3,381,768	151,364	77,961	408,085	3,407,223		274,576	I&E	7	2.504
AUT0309		789,860	81,433		55,577	67,171				I	5	0.1286
AUT0314		1,039,315	2,438,597	134,759	484,839	697,281				I	1	1.1604
AUT0319		468,117	1,326,662	88,025	355,386	456,248		150,000	11,965	I&E	2	0.8639
AUT0321		669,493	2,092,630	88,910	107,698	316,732		150,000	11,965	I&E	11	0.7352
AUT0331		178,562	24,860		21,328	24,867				I	5	0.1286
AUT0333		336,448	786,807	46,794	162,104	227,333				I	1	1.1604
AUT0337		1,110,944	131,046		73,566	92,224				I	5	0.1286
AUT0341		405,256	2,429,275	115,249	412,169	642,794				I	1	1.1604
AUT0345		610,223	5,103,322	267,506	952,013	1,411,106				I	1	1.1604
AUT0349		2,429,925	8,146,829	424,696	1,514,477	2,249,706				I	1	1.1604
AUT0351		301,024	6,389,631	42,269	99,196	966,667	700,911		56,484	I&E	3	3.4562
AUT0358		210,439	2,170,195	117,833	421,759	612,913				I	1	1.1604
AUT0361		433,165	7,652,621	59,105	140,320	1,170,775	893,934		72,039	I&E	3	3.4562
AUT0362		312,830	1,566,464	51,821	185,883	357,091				I	1	1.1604
AUT0364		505,137	5,447,440	170,196	611,090	1,216,487				I	1	1.1604
AUT0365		140,093	445,526	29,331	116,166	150,268				I&E	2	0.8639
AUT0368		83,406	2,715,938	146,752	529,832	769,768				I	1	1.1604
AUT0370		322,374	1,816,861	79,915	289,868	468,633				I	1	1.1604
AUT0379		351,933	41,890		31,041	37,006				I	5	0.1286
AUT0381		50,143	960,912	9,964	22,083	148,931	506,182		40,791	I&E	4	2.5787
AUT0384		146,511	66,229	91,020	104,211	22,620				I&E	2	0.8639
AUT0385		130,966	1,823,217	20,420	25,983	265,149	1,445,463		116,485	I&E	4	2.5787
AUT0387		576,057	5,283,933	122,322	496,655	1,126,646		533,808	42,581	I&E	2	0.8639
AUT0398		537,402	6,842,592	63,631	75,697	986,297	6,440,309		519,001	I&E	4	2.5787
AUT0399		140,486	232,496		9,212	42,314				I	8	0.3315
AUT0401		613,529	578,957		72,110	154,541				I	5	0.1286
AUT0404		291,400	4,124,975	44,642	51,995	594,657	3,259,312		262,656	I&E	4	2.5787
AUT0408		73,728	900,969	13,020	49,057	164,315	803,968		64,789	I&E	4	2.5787
AUT0416		143,562	41,835	96,659	112,954	22,251				I&E	2	0.8639
AUT0423		564,501	29,714,518	122,524	248,148	4,356,303				I&E	9	5.973
AUT0427		148,668	291,697		9,392	50,923				I	8	0.3315
AUT0431		143,775	356,208	20,913	69,450	99,253				I	1	1.1604

Facility ID	Intake ID	EPA assumed design intake flow, gpm (X_{epa}) ($)	Capital cost ($)	Baseline O&M annual cost ($)	Post construction O&M annual cost ($)	Annualized capital[3] + net O&M using EPA design intake flow[2] (X_{epa}) ($)	Net revenue losses from net construction downtime ($)	Pilot study costs ($)	Annualized downtime and pilot study costs[2,4] ($)	Performance standards on which EPA cost estimates are based	EPA modeled technology code	Design flow adjustment slope (m)[1]
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9	Column 10	Column 11	Column 12	Column 13
DUT1085	.....	297,000	2,410,696	159,608	619,834	803,455	.....	243,540	19,427	I&E	2	0.8639
DUT1086	Unit 1	57,292	667,197	29,048	122,691	188,637	.....	.....	.....	I&E	2	0.8639
DUT1086	Unit 2	57,292	667,197	29,048	122,691	188,637	.....	150,000	11,965	I&E	2	0.8639
DUT1088	#4	49,280	865,324	11,129	22,007	134,081	.....	.....	.....	I&E	7	2.504
DUT1088	#5	99,458	1,438,399	12,058	25,232	217,970	1,601,167	.....	129,032	I&E	7	2.504
DUT1093	.....	307,760	9,456,466	.....	33,762	1,380,150	.....	.....	.....	I&E	9	5.973
DUT1097	.....	106,007	2,349,646	.....	242,606	577,143	.....	237,372	18,935	I&E	6	5.0065
DUT1098	.....	71,528	507,025	29,461	99,942	142,669	.....	.....	.....	I	1	1.1604
DUT1100	Units 1 & 2	188,000	.....	.....	.....	.....	.....	.....	.....	I	5	0.1286
DUT1100	Units 3 & 4	188,000	136,878	.....	50,573	70,062	.....	.....	.....	I	5	0.1286
DUT1103	Unit 1 Screenhouse	118,000	.....	.....	.....	.....	.....	.....	.....	I		
DUT1103	Unit 2 Screenhouse	250,000	47,060	.....	31,941	38,642	.....	.....	.....	I	5	0.1286
DUT1103	Hvdc Lake Intake	1,200	34,615	.....	4,734	9,662	.....	.....	.....	I	8	0.3315
DUT1103	Hvdc Separator Dike	1,200	34,615	.....	4,734	9,662	.....	.....	.....	I	8	0.3315
DUT1103	River Intake	7,800	75,587	5,734	15,570	20,597	.....	.....	.....	I	1	1.1604
DUT1109	.....	58,333	873,553	32,385	130,170	222,159	.....	150,000	11,965	I	2	0.8639
DUT1111	Unit 1&2	199,716	764,700	99,547	37,851	47,181	.....	.....	.....	I&E	11	0.7352
DUT1111	Unit 3	189,842	717,221	93,277	35,552	44,391	.....	150,000	11,965	I&E	11	0.7352
DUT1112	.....	193,750	501,403	28,510	96,543	139,421	.....	.....	.....	I	1	1.1604
DUT1113	System 27	1,125,000	6,518,329	281,013	1,001,831	1,648,882	.....	.....	.....	I	1	1.1604
DUT1113	System 67	44,028	181,599	.....	8,508	34,364	.....	.....	.....	I	8	0.3315
DUT1116	.....	355,556	2,886,459	69,804	84,921	426,084	.....	291,604	23,261	I&E	11	0.7352
DUT1118	.....	667,361	140,959	.....	64,789	84,858	.....	.....	.....	I	5	0.1286
DUT1122	.....	120,000	23,134	.....	18,047	21,341	.....	.....	.....	I	5	0.1286
DUT1123	6	111,806	4,071,741	15,536	39,240	603,428	.....	.....	.....	I&E	3	3.4562
DUT1123	7	256,250	5,809,773	.....	431,082	1,258,263	.....	.....	.....	I&E	6	5.0065
DUT1123	8	220,139	5,590,610	27,185	73,721	842,513	1,136,010	.....	91,547	I&E	3	3.4562
DUT1132	.....	1,896,000	3,995,072	197,552	927,311	1,298,568	.....	403,601	32,195	I&E	2	0.8639
DUT1133	.....	213,889	1,180,537	44,631	57,260	180,711	.....	150,000	11,965	I&E	11	0.7352
DUT1138	.....	77,083	264,532	12,475	37,753	62,942	.....	.....	.....	I	1	1.1604
DUT1140	Mc2-4	131,250	334,100	20,512	66,264	93,320	.....	.....	.....	I	1	1.1604
DUT1140	Mc5&6	383,958	1,450,787	82,444	290,867	414,982	.....	.....	.....	I	1	1.1604
DUT1145	.....	178,472	2,702,979	38,035	57,101	403,909	1,565,614	273,068	147,950	I&E	12	3.6581
DUT1146	.....	181,944	325,271	276,184	309,256	79,383	.....	.....	.....	I&E	2	0.8639
DUT1152	.....	399,306	10,606,982	355,225	1,321,682	2,476,653	.....	.....	.....	I	1	1.1604
DUT1156	.....	496,000	16,234,946	67,033	77,047	2,321,504	9,287,608	.....	748,455	I&E	7	2.504
DUT1157	6	110,000	1,262,753	47,827	25,593	157,553	.....	.....	.....	I&E	4	2.5787
DUT1157	7	5,833	305,286	13,438	17,201	47,229	.....	.....	.....	I&E	4	2.5787
DUT1165	1	480,000	9,356,403	220,447	189,951	1,301,645	.....	.....	.....	I&E	3	3.4562
DUT1165	2	489,233	.....	.....	.....	.....	9,426,676	.....	759,662	I&E		
DUT1169	.....	620,000	14,855,719	47,990	185,073	2,252,203	1,896,934	.....	152,867	I&E	3	3.4562
DUT1173	.....	37,986	312,285	18,521	72,119	98,061	.....	.....	.....	I&E	2	0.8639
DUT1179	.....	390,278	1,204,485	74,177	261,241	358,556	.....	.....	.....	I	1	1.1604
DUT1185	.....	225,000	3,496,693	21,560	51,324	527,614	1,266,125	.....	102,032	I&E	7	2.504
DUT1186	Unit 4	62,000	577,654	26,371	88,907	144,780	.....	.....	.....	I	1	1.1604
DUT1186	Unit 5	62,000	577,654	26,371	88,907	144,780	.....	.....	.....	I	1	1.1604
DUT1187	Mt 2&3	147,014	.....	.....	.....	.....	.....	.....	.....	I	5	0.1286
DUT1187	Mt 6-8	500,000	78,370	.....	47,573	58,732	.....	.....	.....	I	5	0.1286
DUT1189	Unit 6 & 8	72,222	.....	.....	.....	.....	.....	.....	.....	I	5	0.1286
DUT1189	Unit 7	80,000	22,427	.....	19,852	23,045	.....	.....	.....	I	5	0.1286
DUT1198	.....	279,511	5,198,159	27,451	92,443	805,093	268,118	.....	21,607	I&E	3	3.4562
DUT1202	Power Plant	36,000	1,154,817	.....	13,668	178,088	.....	.....	.....	I&E	11	0.7352
DUT1202	Filtration Plant	30,000	987,137	.....	13,284	153,830	.....	.....	.....	I&E	9	5.973

Appendix B: Facility ID and Facility Name for All Facilities Not Claiming Survey Information CBI

Facility ID	Facility name
AUT0001	Cane Run
AUT0002	Chesapeake
AUT0004	Hennepin
AUT0010	Bowen
AUT0011	Shawville
AUT0012	Diablo Canyon Nuclear
AUT0013	Montville
AUT0014	Williams
AUT0015	Northport
AUT0016	Cholla
AUT0018	R M Heskett Station
AUT0019	Charles Poletti
AUT0020	B L England
AUT0021	B C Cobb
AUT0022	St Johns River Power
AUT0024	Bull Run
AUT0027	Lake Hubbard
AUT0033	Muscatine
AUT0036	*Edgewater*
AUT0041	Edwin I Hatch
AUT0044	Hunters Point
AUT0047	Michoud
AUT0049	Chalk Point
AUT0050	Wyandotte
AUT0051	Suwannee River
AUT0053	Nelson Dewey
AUT0054	Flint Creek
AUT0057	Thomas Fitzhugh
AUT0058	Mercer
AUT0064	Decordova
AUT0066	Fermi Nuclear
AUT0067	Henry D King
AUT0068	Scattergood
AUT0071	Oswego
AUT0072	Sioux
AUT0073	Lake Catherine
AUT0078	Missouri City
AUT0079	Eagle Mountain
AUT0080	Lone Star
AUT0083	*Schiller*
AUT0084	Salem Nuclear
AUT0085	Point Beach Nuclear
AUT0092	Linden
AUT0093	Perry Nuclear
AUT0095	Tyrone
AUT0097	Little Gypsy
AUT0101	Lakeside
AUT0106	Cheswick
AUT0110	C P Crane
AUT0111	Cape Fear
AUT0114	Kewaunee Nuclear
AUT0120	Norwalk Harbor
AUT0123	Warren
AUT0125	Beaver Valley Nuclear
AUT0127	Lake Road
AUT0129	Susquehanna Nuclear
AUT0130	Elmer W Stout
AUT0131	Hammond
AUT0134	Mount Tom
AUT0137	Mitchell
AUT0139	*Albany*
AUT0142	Lauderdale
AUT0143	Wood River
AUT0146	Meredosia
AUT0148	Tanners Creek
AUT0149	Thomas Hill
AUT0151	Decker Creek
AUT0152	Duck Creek
AUT0156	Waterford 1 & 2
AUT0157	Pulliam
AUT0160	L V Sutton
AUT0161	*Valley*
AUT0163	Belle River
AUT0168	E F Barrett
AUT0170	O W Sommers
AUT0171	New Madrid
AUT0173	Fort Calhoun Nuclear
AUT0174	Herbert a Wagner
AUT0175	R E Burger
AUT0176	Martin Lake
AUT0178	Mt Storm
AUT0181	Prairie Creek
AUT0182	Arsenal Hill
AUT0183	Schuylkill
AUT0185	Gallatin
AUT0187	North Anna Nuclear
AUT0190	Ginna
AUT0191	J H Campbell
AUT0192	R W Miller
AUT0193	Joliet 29
AUT0196	Southside
AUT0197	Austin-dt
AUT0201	*Cope*
AUT0202	Donald C Cook Nuclear
AUT0203	Riverside
AUT0205	Joliet 9
AUT0208	New Castle
AUT0215	Coleto Creek
AUT0216	Fort St Vrain
AUT0221	Polk
AUT0222	Marion
AUT0226	Sooner
AUT0227	Silver Lake
AUT0228	High Bridge
AUT0229	Dan E Karn
AUT0230	McWilliams
AUT0232	V H Braunig
AUT0235	Sam Rayburn
AUT0238	North Lake
AUT0240	Lee
AUT0241	J B Sims
AUT0242	Quad Cities Nuclear
AUT0244	Elk River
AUT0245	*Avon Lake*
AUT0246	Canaday
AUT0248	Sam Bertron
AUT0254	Chamois
AUT0255	Cooper
AUT0257	Gerald Gentleman
AUT0260	Marshall
AUT0261	Dale
AUT0264	Indian Point 3 Nucler
AUT0266	North Omaha
AUT0268	Cutler
AUT0270	Possum Point
AUT0273	Stanton
AUT0275	Seabrook Nuclear
AUT0276	River Rouge
AUT0277	Dubuque
AUT0278	Morgantown
AUT0284	Handley
AUT0285	Conners Creek
AUT0286	Welsh
AUT0287	Horseshoe Lake
AUT0292	*Harris Nuclear*
AUT0295	Jack Mcdonough
AUT0296	W H Zimmer
AUT0297	Quindaro
AUT0298	Harllee Branch
AUT0299	Chesterfield
AUT0300	Eckert Station
AUT0302	U.S. DOE SRS (D-area)
AUT0304	Lansing
AUT0305	Kahe
AUT0307	Rodemacher
AUT0308	*W S Lee*
AUT0309	Wilkes
AUT0310	A B Paterson
AUT0314	Philip Sporn
AUT0315	Sabine
AUT0319	Cliffside
AUT0321	J E Corette
AUT0331	Lake Creek
AUT0333	Hamilton
AUT0337	Johnsonville
AUT0341	Montrose
AUT0343	John E Amos
AUT0344	Weston
AUT0345	Summer Nuclear
AUT0349	McGuire Nuclear
AUT0350	Clinton Nuclear
AUT0351	Portland
AUT0355	Limerick Nuclear
AUT0356	Byron Nuclear
AUT0358	H T Pritchard
AUT0359	Hookers Point
AUT0361	*Hawthorn*
AUT0362	Teche
AUT0363	Wansley
AUT0364	Dresden Nuclear
AUT0365	Arkwright
AUT0368	Kaw
AUT0370	Deepwater
AUT0373	Valmont
AUT0379	Lake Pauline
AUT0380	Will County
AUT0381	Healy
AUT0384	Somerset
AUT0385	Hutsonville
AUT0387	Haynes
AUT0388	Lewis Creek
AUT0390	Fort Churchill
AUT0394	Nebraska City
AUT0396	Bremo Power Station
AUT0397	George Neal North
AUT0398	Iatan
AUT0399	Boomer Lake
AUT0401	*Fort Myers*
AUT0403	Nine Mile Point Nuclear
AUT0404	Mitchell
AUT0405	Fisk
AUT0406	Merom
AUT0408	Cameo
AUT0411	Roseton
AUT0415	Rochester 7
AUT0416	Noblesville
AUT0419	Brunswick Nuclear
AUT0423	James A Fitzpatrick
AUT0424	Davis-besse
AUT0427	Blount Street
AUT0431	San Angelo
AUT0433	Mistersky
AUT0434	Paradise
AUT0435	Shiras
AUT0440	Eaton
AUT0441	Piqua
AUT0443	Milton L Kapp
AUT0444	Gibbons Creek
AUT0446	*Richard H. Gorsuch*
AUT0449	Big Brown
AUT0453	Four Corners
AUT0455	Seminole
AUT0459	Vogtle Nuclear
AUT0462	Warrick
AUT0463	Rex Brown
AUT0467	Vero Beach
AUT0472	Miami Fort
AUT0473	Palisades Nuclear

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DOCKET NO. 2006-0386
ATTACHMENT 1
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Facility ID	Facility name
AUT0476 ...	Trinidad
AUT0477 ...	Fair Station
AUT0478 ...	Dansby
AUT0481 ...	Powerlane
AUT0482 ...	Gen J M Gavin
AUT0483 ...	Shawnee
AUT0489 ...	Nearman Creek
AUT0490 ...	Buck
AUT0492 ...	Collins
AUT0493 ...	E S Joslin
AUT0496 ...	Indian River
AUT0499 ...	Bay Front
AUT0500 ...	Big Cajun 2
AUT0501 ...	Jack Watson
AUT0507 ...	Crawford
AUT0512 ...	*J K Spruce*
AUT0513 ...	Waterford #3 Nuclear
AUT0515 ...	Rockport
AUT0517 ...	Humboldt Bay
AUT0518 ...	James River
AUT0521 ...	Menasha
AUT0522 ...	Jefferies
AUT0523 ...	Walter C Beckjord
AUT0529 ...	Gould Street
AUT0531 ...	Braidwood Nuclear
AUT0534 ...	Crisp
AUT0535 ...	Urquhart
AUT0536 ...	Rush Island
AUT0537 ...	Dallman
AUT0538 ...	Genoa
AUT0539 ...	Edge Moor
AUT0540 ...	J P Madgett
AUT0541 ...	Indian Point Nuclear
AUT0544 ...	Eddystone
AUT0546 ...	Watts Bar Nuclear
AUT0547 ...	Muskingum River
AUT0551 ...	Allen S King
AUT0552 ...	Kingston
AUT0553 ...	Hunlock Pwr Station
AUT0554 ...	Potomac River
AUT0555 ...	Zuni
AUT0557 ...	Sayreville
AUT0561 ...	*J T Deely*
AUT0564 ...	Kyger Creek
AUT0567 ...	F B Culley
AUT0568 ...	Northside
AUT0570 ...	Peach Bottom Nuclear
AUT0571 ...	Baxter Wilson
AUT0573 ...	San Onofre Nuclear
AUT0575 ...	Trenton Channel
AUT0577 ...	Middletown
AUT0580 ...	Sixth Street
AUT0582 ...	E W Brown
AUT0583 ...	Dave Johnston
AUT0585 ...	Burlington
AUT0588 ...	Monticello
AUT0590 ...	C D McIntosh Jr
AUT0599 ...	Kearny
AUT0600 ...	Kincaid
AUT0601 ...	Bridgeport Harbor
AUT0602 ...	Mason Steam
AUT0603 ...	Astoria
AUT0604 ...	C R Huntley
AUT0606 ...	Hmp&l Station 2
AUT0607 ...	Moss Landing
AUT0608 ...	Pilgrim Nuclear
AUT0611 ...	New Boston
AUT0612 ...	Huntington Beach
AUT0613 ...	Morro Bay
AUT0617 ...	Ravenswood
AUT0618 ...	New Haven Harbor
AUT0619 ...	William F Wyman
AUT0620 ...	Dunkirk
AUT0621 ...	Contra Costa
AUT0623 ...	Kendall Square
AUT0625 ...	Encina
AUT0630 ...	Lovett
AUT0631 ...	Salem Harbor
AUT0635 ...	Aes Hickling
AUT0637 ...	Ormond Beach
AUT0638 ...	Mandalay
AUT0639 ...	Pittsburg
DMU3244 ..	University of Notre Dame Power Plant
DMU3310 ..	University of Iowa —Main Power Plant
DNU2002 ...	Brooklyn Navy Yard Cogeneration Partners, L.P.
DNU2011 ...	Long Beach Generation
DNU2013 ...	*Maine Energy Recovery Company*
DNU2014 ...	Baltimore Resco
DNU2015 ...	Southern Energy-Canal
DNU2017 ...	Westchester Resco Co.
DNU2018 ...	Grays Ferry Cogeneration Partnership
DNU2021 ...	Morgantown
DNU2025 ...	Sparrows Point Div Bethlehem Steel Corp
DNU2031 ...	Ch Resources —Beaver Falls
DNU2032 ...	Duke Energy South Bay
DNU2038 ...	Saugus Resco
DNU2047 ...	El Segundo Power
DUT0062 ...	Leland Olds Station
DUT0576 ...	Sam O. Purdom Generating Station
DUT1002 ...	Monroe
DUT1003 ...	Peru
DUT1006 ...	Martins Creek
DUT1007 ...	Presque Isle
DUT1008 ...	Far Rockaway
DUT1011 ...	Stryker Creek
DUT1012 ...	Grand Tower
DUT1014 ...	Dolphus M Grainger
DUT1021 ...	Alma
DUT1022 ...	Comanche Peak Nuclear
DUT1023 ...	*Oyster Creek Nuclear*
DUT1026 ...	Delaware
DUT1029 ...	Crystal River
DUT1031 ...	Merrimack
DUT1033 ...	J C Weadock
DUT1034 ...	South Oak Creek
DUT1036 ...	Allen
DUT1038 ...	North Texas
DUT1041 ...	Elmer Smith
DUT1043 ...	Ray Olinger
DUT1044 ...	Tradinghouse
DUT1046 ...	Labadie
DUT1047 ...	Elrama
DUT1048 ...	Holly Street
DUT1049 ...	Joppa Steam
DUT1050 ...	Browns Ferry Nuclear
DUT1051 ...	Havana
DUT1056 ...	Webster
DUT1057 ...	Wateree
DUT1062 ...	Fayette Power Prj
DUT1066 ...	F J Gannon
DUT1067 ...	Paint Creek
DUT1068 ...	Harbor
DUT1070 ...	Millstone
DUT1072 ...	Graham
DUT1084 ...	Fort Phantom
DUT1085 ...	Petersburg
DUT1086 ...	Valley
DUT1088 ...	Seward
DUT1093 ...	Bailly
DUT1097 ...	Rock River
DUT1098 ...	Blackhawk
DUT1100 ...	Sewaren
DUT1103 ...	Milton R Young
DUT1109 ...	Riverside
DUT1111 ...	E D Edwards
DUT1112 ...	Lieberman
DUT1113 ...	Sequoyah Nuclear
DUT1116 ...	Waiau
DUT1117 ...	Columbia
DUT1118 ...	Cooper
DUT1122 ...	Edgewater
DUT1123 ...	Waukegan
DUT1132 ...	Cumberland
DUT1133 ...	J R Whiting
DUT1138 ...	Harbor
DUT1140 ...	Morgan Creek
DUT1142 ...	*Victoria*
DUT1143 ...	East River
DUT1145 ...	Honolulu
DUT1146 ...	Devon
DUT1148 ...	Council Bluffs
DUT1152 ...	Coffeen
DUT1153 ...	Mill Creek
DUT1154 ...	McClellan
DUT1155 ...	P H Robinson
DUT1156 ...	John Sevier
DUT1157 ...	Sterlington
DUT1161 ...	Robert E Ritchie
DUT1165 ...	Big Bend
DUT1167 ...	Ninemile Point
DUT1169 ...	Hudson
DUT1170 ...	Carl Bailey
DUT1172 ...	Barney M Davis
DUT1173 ...	Logansport
DUT1174 ...	Arkansas Nuclear One
DUT1175 ...	Fox Lake
DUT1179 ...	Pirkey
DUT1185 ...	Cromby
DUT1186 ...	Glenwood
DUT1187 ...	Mountain Creek
DUT1189 ...	Larsen Memorial
DUT1191 ...	Monroe
DUT1192 ...	Meramec
DUT1194 ...	*Gerald Andrus*
DUT1198 ...	O H Hutchings
DUT1202 ...	Manitowoc
DUT1206 ...	Indian River
DUT1209 ...	Widows Creek
DUT1211 ...	Surry Nuclear
DUT1212 ...	J M Stuart
DUT1213 ...	Riverside
DUT1214 ...	Charles R Lowman
DUT1217 ...	Deepwater
DUT1219 ...	Port Washington
DUT1223 ...	Nueces Bay
DUT1225 ...	Burlington
DUT1227 ...	Sibley
DUT1228 ...	Willow Glen
DUT1229 ...	Riverton
DUT1235 ...	Riverside
DUT1238 ...	Cedar Bayou
DUT1248 ...	Knox Lee
DUT1249 ...	Oak Creek
DUT1250 ...	Vermont Yankee Nuclear
DUT1252 ...	Muskogee
DUT1258 ...	St Clair
DUT1259 ...	James De Young
DUT1261 ...	Green River
DUT1265 ...	River Crest
DUT1268 ...	Calvert Cliffs Nuclear
DUT1269 ...	Dean H Mitchell
DUT1270 ...	Pueblo
DUT1271 ...	Michigan City
DUT1272 ...	Monticello
DUT1273 ...	Sim Gideon

CWA-2.2.4 (HECO)
316(b) Studies
JW

COPY

INTEROFFICE CORRESPONDENCE

Hawaiian Electric Co., Inc.

December 5, 2005

To: T.C. Simmons

From: Sherri Lo

Subject: Clean Water Act Section 316(b) Studies
Authorization for Preliminary Engineering Workorder Charges In Excees of $20K

In accordance with Company accounting procedures, this IOC requests your approval of the following preliminary engineering charges in excess of $20,000 for the subject CWA §316(b) Cooling Water Intake Studies at Honolulu, Waiau and Kahe power plants. A preliminary engineering workorder number was created for each power plant site.

As you are aware, compliance with the new §316(b) regulation is mandatory, with an established compliance deadlines. This request covers the first phase of compliance work, which takes us through the completion and submittal of a Comprehensive Demonstration Study to DOH in early 2008.

Preliminary Engineering Charge Number	Description	Expenditures to Date as of November 2005	Total Forecasted Preliminary Engingeering Expenditures
HP002066	316(b) Honolulu PP	$30,242	$355,500
HP002067	316(b) Waiau PP	$31,133	$355,500
HP002068	316(b) Kahe PP	$32,861	$355,500

Expenditures to date were for the development of the Proposal for Information Collection (PIC) that was submitted to the Hawaii Department of Health in October 2005.

The forecast amount takes into to account the following three activities at each facility:

Proposal for Information Collection (completed)	$55,500
Technology Assessment (delivered by 6/30/06)	$25,000
Impingement & Entrainment Monitoring (from 01/01/06 – 01/01/07)	$125,000
Comprehensive Demonstration Study (delivered by January 2008)	$150,000
Total	$355,500

It should be noted that the forecast assumes that one of the currently allowed compliance options, the Restoration option, will still be available. This option is currently being litigated in Federal court. If the court ruling (expected by July 2006) eliminates the Restoration option, then HECO will need to conduct pilot studies to evaluate the effectiveness of the remaining, but limited 316(b) compliance technologies available. The implementation costs of these pilot studies will be highly dependent on the results of the monitoring data we collect, but could easily exceed $1M per facility.

Your approval to exceed $20,000 on the above three (3) preliminary engineering workorder numbers is requested. If you have any questions regarding the above information, please contact Kirk Tomita at x4528.

Approved:

T.C. Simmons
V.P., Power Supply

cc: B. Morikuni

HAWAIIAN ELECTRIC COMPANY INC.
2007 RATE CASE
Costs Incurred for 316(b) Work for the period 2005 under workorder number HP002066 (Honolulu PP -316(b))

RA / Exp Element	Jan. 2005	Feb. 2005	Mar. 2005	Apr. 2005	May 2005	June 2005	July 2005	Aug. 2005	Sept. 2005	Oct. 2005	Nov. 2005	Dec. 2005	Totals
JW - Water & Hazardous Materials Division (Environmental Dept.)													
Labor -150			$211	$32	$178	$227	$267	$373	$113	$113	$283	$146	$1,944
Labor True-up - 155			$16	$3	$40	$21	$30	$64	$13	$17	$41	$26	$271
Overheads			$106	$17	$95	$112	$132	$191	$59	$59	$144	$73	$987
	$0	$0	$332	$52	$313	$360	$429	$627	$185	$190	$468	$245	$3,201
JA - Administrative Division (Environmental Dept.)													
Labor -150										$6			$6
Labor True-up - 155										$1			$1
Overheads										$3			$3
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$10	$0	$0	$10
BT - Structural Division (Engineering Dept.)													
Labor -150	$285		$134	$33									$452
Labor True-up - 155	$20	($2)	$10	$3									$31
Overheads	$380		$184	$47									$610
Outside Services - 501				$68				$24,975		$118		$31,688	$56,850
	$685	($2)	$328	$151	$0	$0	$0	$24,975	$0	$118	$0	$31,688	$57,943
YJ - Project Management Division (Power Supply Engineering Dept.)													
Labor -150	$39		$158		$39	$79	$118	$79			$39	$39	$591
Labor True-up - 155	$3		$12		$9	$8	$14	$13			$6	$7	$70
Overheads	$26		$108		$28	$61	$91	$60			$32	$32	$438
	$68	$0	$277	$0	$76	$147	$223	$152	$0	$0	$77	$78	$1,098
Totals													
Labor -150	$324	$0	$502	$66	$218	$306	$385	$451	$113	$119	$323	$185	$2,992
Labor True-up - 155	$23	($2)	$37	$5	$49	$29	$44	$77	$13	$18	$46	$33	$373
Overheads	$406	$0	$398	$63	$123	$173	$222	$251	$59	$62	$175	$105	$2,038
Outside Services - 501	$0	$0	$0	$68	$0	$0	$0	$24,975	$0	$118	$0	$31,688	$56,850
	$753	($2)	$937	$203	$390	$507	$652	$25,754	$185	$318	$544	$32,011	$62,252

Note: Totals may not add exactly due to rounding.

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HAWAIIAN ELECTRIC COMPANY INC.
2007 RATE CASE
Costs Incurred for 316(b) Work for the period 2006 under workorder number HP002066 (Honolulu PP - 316(b))

RA / Exp Element	Jan. 2006	Feb. 2006	Mar. 2006	Apr. 2006	May 2006	June 2006	July 2006	Aug. 2006	Sept. 2006	Oct. 2006	Nov. 2006	Dec. 2006	Totals
JW - Water & Hazardous Materials Division (Environmental Dept.)													
Labor -150	$188	$768	$256	$560	$512	$306	$256	$128	$699		$102		$3,774
Labor True-up - 155	$15	$49	$25	$14	$57	($11)	$41	$17	$109		$11		$327
Overheads	$116	$451	$154	$339	$314	$181	$162	$81	$451		$72		$2,321
	$319	$1,267	$435	$913	$883	$475	$458	$226	$1,259	$0	$186	$0	$6,422
JA - Administrative Division (Environmental Dept.)													
Labor -150					$6		$16		$25				$47
Labor True-up - 155					$1		$3		$3				$7
Overheads					$3		$10		$14				$28
	$0	$0	$0	$0	$10	$0	$29	$0	$43	$0	$0	$0	$81
YJ - Project Management Division (Power Supply Engineering Dept.)													
Labor -150		$83		$42	$42					$51			$218
Labor True-up - 155		$5		$1	$4					$10			$21
Overheads		$71		$36	$34					$33			$173
	$0	$159	$0	$78	$80	$0	$0	$0	$0	$94	$0	$0	$412
BT - Structural Division (Engineering Dept.)													
Outside Services - 501							$26,584	$329	$33,889	$18,142	$19,027	$761	$98,733
Mainland Travel - 520						$52		$510		$239			$801
Meals - 521						$6				$66			$72
	$0	$0	$0	$0	$0	$58	$26,584	$839	$33,889	$18,447	$19,027	$761	$99,606
Totals													
Labor -150	$188	$851	$256	$602	$559	$306	$272	$128	$725	$51	$102	$0	$4,039
Labor True-up - 155	$15	$54	$25	$15	$62	($11)	$43	$17	$112	$10	$11	$0	$355
Overheads	$116	$522	$154	$375	$352	$181	$172	$81	$465	$33	$72	$0	$2,522
Outside Services - 501	$0	$0	$0	$0	$0	$0	$26,584	$329	$33,889	$18,142	$19,027	$761	$98,733
Mainland Travel - 520	$0	$0	$0	$0	$0	$52	$0	$510	$0	$239	$0	$0	$801
Meals - 521	$0	$0	$0	$0	$0	$6	$0	$0	$0	$66	$0	$0	$72
	$319	$1,427	$435	$991	$973	$533	$27,072	$1,065	$35,191	$18,541	$19,213	$761	$106,521

Note: Totals may not add exactly due to rounding.

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HAWAIIAN ELECTRIC COMPANY INC.
2007 RATE CASE
Costs Incurred for 316(b) Work for the period Jan. - Apr. 2007
under workorder number HP002066 (Honolulu PP - 316(b))

RA / Exp Element	Jan. 2007	Feb. 2007	Mar. 2007	Apr. 2007	Totals
JW - Water & Hazardous Materials Division (Environmental Dept.)					
Labor -150	$260	$223	$826	$288	$1,597
Labor True-up - 155	$14	($13)	$36	$13	$51
Overheads	$165	$133	$517	$171	$986
	$439	$343	$1,380	$472	$2,634
BT - Structural Division (Engineering Dept.)					
Outside Services - 501	$15,850	$12,646	$10,527	$58,071	$97,095
Mainland Travel - 520			$202	$119	$320
Meals - 521				$14	$14
	$15,850	$12,646	$10,729	$58,204	$97,429
JA - Administrative Division (Environmental Dept.)					
Labor -150		$51		$26	$77
Labor True-up - 155		($3)		$1	($2)
Overheads		$31		$15	$46
	$0	$79	$0	$42	$121
Totals					
Labor -150	$260	$274	$826	$313	$1,674
Labor True-up - 155	$14	($16)	$36	$14	$49
Overheads	$165	$164	$517	$186	$1,032
Outside Services - 501	$15,850	$12,646	$10,527	$58,071	$97,095
Mainland Travel - 520	$0	$0	$202	$119	$320
Meals - 521	$0	$0	$0	$14	$14
	$16,289	$13,068	$12,109	$58,717	$100,184

Note: Totals may not add exactly due to rounding.

HAWAIIAN ELECTRIC COMPANY INC.
2007 RATE CASE
Costs Incurred for 316(b) Work for the period 2005 under workorder number HP002067 (Waiau PP - 316(b))

RA / Exp Element	Jan. 2005	Feb. 2005	Mar. 2005	Apr. 2005	May 2005	June 2005	July 2005	Aug. 2005	Sept. 2005	Oct. 2005	Nov. 2005	Dec. 2005	Totals
JW - Water & Hazardous Materials Division (Environmental Dept.)													
Labor -150			$178	$65	$243	$243	$316	$373	$130	$146	$324	$146	$2,162
Labor True-up - 155			$7	$5	$63	$25	$38	$64	$15	$24	$45	$26	$312
Overheads			$87	$34	$130	$122	$158	$191	$67	$76	$164	$73	$1,102
	$0	$0	$272	$104	$436	$390	$512	$627	$211	$246	$533	$245	$3,575
JA - Administrative Division (Environmental Dept.)													
Labor -150										$6			$6
Labor True-up - 155										$1			$1
Overheads										$3			$3
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$10	$0	$0	$10
BT - Structural Division (Engineering Dept.)													
Labor -150	$469	$33	$134	$33									$669
Labor True-up - 155	$35	($0)	$6	$3									$43
Overheads	$626	$45	$183	$46									$901
Outside Services - 501								$24,975		$118		$31,688	$56,782
	$1,130	$78	$323	$82	$0	$0	$0	$24,975	$0	$118	$0	$31,688	$58,395
YJ - Project Management Division (Power Supply Engineering Dept.)													
Labor -150	$39	$39	$158		$39	$79	$118	$79			$39	$39	$630
Labor True-up - 155	$3	($0)	$6		$10	$8	$14	$13			$6	$7	$67
Overheads	$27	$26	$109		$29	$60	$90	$60			$32	$32	$465
	$70	$65	$273	$0	$78	$146	$222	$152	$0	$0	$77	$78	$1,163
Totals													
Labor -150	$508	$73	$470	$98	$282	$322	$434	$451	$130	$152	$363	$185	$3,467
Labor True-up - 155	$38	($0)	$19	$7	$73	$33	$52	$77	$15	$25	$51	$33	$423
Overheads	$654	$71	$379	$81	$159	$182	$248	$251	$67	$79	$196	$105	$2,471
Outside Services - 501	$0	$0	$0	$0	$0	$0	$0	$24,975	$0	$118	$0	$31,688	$56,782
	$1,200	$143	$868	$186	$514	$537	$734	$25,755	$211	$374	$610	$32,011	$63,143

Note: Totals may not add exactly due to rounding.

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HAWAIIAN ELECTRIC COMPANY INC.
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Costs Incurred for 316(b) Work for the period 2006 under workorder number HP002067 (Waiau PP - 316(b))

RA / Exp Element	Jan. 2006	Feb. 2006	Mar. 2006	Apr. 2006	May 2006	June 2006	July 2006	Aug. 2006	Sept. 2006	Oct. 2006	Nov. 2006	Dec. 2006	Totals
JW - Water & Hazardous Materials Division (Environmental Dept.)													
Labor -150	$213	$895	$281	$1,122	$610	$419	$273	$136	$810	$60	$102		$4,923
Labor True-up - 155	$21	$80	$16	($6)	$73	$34	$75	$9	$55	$12	$8	$6	$384
Overheads	$132	$538	$162	$717	$370	$243	$174	$77	$505	$38	$70	$1	$3,026
	$366	$1,514	$459	$1,832	$1,053	$696	$523	$222	$1,370	$110	$180	$6	$8,332
JA - Administrative Division (Environmental Dept.)													
Labor -150							$16		$25				$41
Labor True-up - 155							$5		$2				$7
Overheads							$11		$17				$28
	$0	$0	$0	$0	$0	$0	$32	$0	$44	$0	$0	$0	$76
YJ - Project Management Division (Power Supply Engineering Dept.)													
Labor -150													$0
Labor True-up - 155													$0
Overheads													$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
IT - Traveling Maintenance (Power Supply Operations & Maintenance Dept.)													
Labor -150								$588					$588
Labor True-up - 155								$43					$43
Overheads								$522					$522
	$0	$0	$0	$0	$0	$0	$0	$1,152	$0	$0	$0	$0	$1,152
IX - Waiau Station Maintenance (Power Supply Operations & Maintenance Dept.)													
Labor -150			$141	$145	$290	$1,546		$3,604	$81		$54		$5,860
Labor True-up - 155			$8	($1)	$35	$127		$425	$6		$4		$603
Overheads			$115	$129	$266	$1,354		$3,128	$86		$57		$5,136
	$0	$0	$264	$273	$590	$3,027	$0	$7,157	$172	$0	$115	$0	$11,599
BT - Structural Division (Engineering Dept.)													
Materials - 201				$5,965	$421	$188	$15	$1,778	$94				$8,461
Materials Purchasing Card - 205					$11	$13							$24
Outside Services - 501						$13,125	$26,967	$329	$33,889	$18,142	$19,027	$761	$112,240
Mainland Travel - 520						$52		$510		$239			$801
Meals - 521						$6				$66			$72
	$0	$0	$0	$5,965	$433	$13,383	$26,982	$2,617	$33,983	$18,447	$19,027	$761	$121,599

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2007 RATE CASE
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RA / Exp Element	Jan. 2006	Feb. 2006	Mar. 2006	Apr. 2006	May 2006	June 2006	July 2006	Aug. 2006	Sept. 2006	Oct. 2006	Nov. 2006	Dec. 2006	Totals
Totals													
Labor -150	$213	$895	$422	$1,267	$900	$1,965	$289	$4,328	$916	$60	$157	$0	$11,412
Labor True-up - 155	$21	$80	$24	($7)	$108	$161	$80	$477	$62	$12	$12	$6	$1,037
Overheads	$132	$538	$277	$846	$635	$1,597	$186	$3,727	$608	$38	$127	$1	$8,711
Materials - 201	$0	$0	$0	$5,965	$421	$188	$15	$1,778	$0	$0	$0	$0	$8,367
Materials Purchasing Ca	$0	$0	$0	$0	$11	$13	$0	$0	$94	$0	$0	$0	$118
Outside Services - 501	$0	$0	$0	$0	$0	$13,125	$26,967	$329	$33,889	$18,142	$19,027	$761	$112,240
Mainland Travel - 520	$0	$0	$0	$0	$0	$52	$0	$510	$0	$239	$0	$0	$801
Meals - 521	$0	$0	$0	$0	$0	$6	$0	$0	$0	$66	$0	$0	$72
	$366	$1,514	$724	$8,070	$2,076	$17,107	$27,537	$11,149	$35,569	$18,557	$19,323	$767	$142,759

Note: Totals may not add exactly due to rounding.

HAWAIIAN ELECTRIC COMPANY INC.
2007 RATE CASE
Costs Incurred for 316(b) Work for the period Jan. - Apr. 2007
under workorder number HP002067 (Waiau PP - 316(b))

RA / Exp Element	Jan. 2007	Feb. 2007	Mar. 2007	Apr. 2007	Totals
JW - Water & Hazardous Materials Division (Environmental Dept.)					
Labor -150	$223	$241	$854	$306	$1,625
Labor True-up - 155	$12	($12)	$41	$14	$54
Overheads	$141	$144	$535	$182	$1,002
	$376	$373	$1,430	$502	$2,681
BT - Structural Division (Engineering Dept.)					
Outside Services - 501	$22,026	$12,646	$11,717	$58,185	$104,574
Mainland Travel - 520			$202	$119	$320
Meals - 521				$14	$14
	$22,026	$12,646	$11,919	$58,317	$104,908
JA - Administrative Division (Environmental Dept.)					
Labor -150		$51		$26	$77
Labor True-up - 155		($3)		$1	($2)
Overheads		$32		$16	$47
	$0	$80	$0	$43	$123
Totals					
Labor -150	$223	$293	$854	$332	$1,701
Labor True-up - 155	$12	($15)	$41	$15	$53
Overheads	$141	$176	$535	$197	$1,050
Outside Services - 501	$22,026	$12,646	$11,717	$58,185	$104,574
Mainland Travel - 520	$0	$0	$202	$119	$320
Meals - 521	$0	$0	$0	$14	$14
	$22,403	$13,099	$13,348	$58,861	$107,712

Note: Totals may not add exactly due to rounding.

HAWAIIAN ELECTRIC COMPANY INC.
2007 RATE CASE
Costs Incurred for 316(b) Work for the period 2005 under workorder number HP002068 (Kahe PP - 316(b))

RA / Exp Element	Jan. 2005	Feb. 2005	Mar. 2005	Apr. 2005	May 2005	June 2005	July 2005	Aug. 2005	Sept. 2005	Oct. 2005	Nov. 2005	Dec. 2005	Totals
JW - Water & Hazardous Materials Division (Environmental Dept.)													
Labor -150			$356	$81	$259	$324	$421	$275	$97	$146	$340	$146	$2,446
Labor True-up - 155			$37	$7	$67	$45	$60	$36	$12	$24	$48	$26	$362
Overheads			$183	$43	$140	$163	$211	$139	$50	$76	$173	$73	$1,250
	$0	$0	$576	$131	$466	$531	$692	$450	$159	$246	$561	$245	$4,058
JA - Administrative Division (Environmental Dept.)													
Labor -150										$6			$6
Labor True-up - 155										$1			$1
Overheads										$3			$3
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$10	$0	$0	$10
BT - Structural Division (Engineering Dept.)													
Labor -150	$787		$134	$33									$954
Labor True-up - 155	$66		$14	$3									$83
Overheads	$1,054		$185	$46									$1,285
Outside Services - 501		$383						$25,050		$118		$31,783	$57,335
	$1,906	$383	$333	$83	$0	$0	$0	$25,050	$0	$118	$0	$31,783	$59,657
YJ - Project Management Division (Power Supply Engineering Dept.)													
Labor -150	$39	$39	$158		$39	$79	$158	$79			$39	$39	$669
Labor True-up - 155	$3	($8)	$16		$10	$11	$22	$10			$5	$7	$78
Overheads	$28	$24	$109		$28	$62	$120	$60			$31	$32	$495
	$71	$56	$283	$0	$78	$152	$300	$149	$0	$0	$76	$78	$1,242
Totals													
Labor -150	$826	$39	$648	$114	$299	$403	$579	$354	$97	$152	$380	$185	$4,075
Labor True-up - 155	$69	($8)	$68	$10	$77	$56	$82	$46	$12	$25	$54	$33	$523
Overheads	$1,081	$24	$477	$89	$168	$225	$331	$199	$50	$79	$204	$105	$3,034
Outside Services - 501	$0	$383	$0	$0	$0	$0	$0	$25,050	$0	$118	$0	$31,783	$57,335
	$1,977	$439	$1,193	$214	$543	$683	$991	$25,649	$159	$374	$637	$32,106	$64,967

Note: Totals may not add exactly due to rounding.

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HAWAIIAN ELECTRIC COMPANY INC.
2007 RATE CASE
Costs Incurred for 316(b) Work for the period 2006 under workorder number HP002068 (Kahe PP - 316(b))

RA / Exp Element	Jan. 2006	Feb. 2006	Mar. 2006	Apr. 2006	May 2006	June 2006	July 2006	Aug. 2006	Sept. 2006	Oct. 2006	Nov. 2006	Dec.2006	Totals
JW - Water & Hazardous Materials Division (Environmental Dept.)													
Labor -150	$213	$938	$298	$859	$495	$348	$273	$145	$742	$51	$102		$4,465
Labor True-up - 155	$21	$85	$24	$13	$53	($18)	$45	$22	$120	$10	$11		$386
Overheads	$132	$563	$176	$564	$301	$206	$172	$92	$478	$33	$72		$2,789
	$366	$1,587	$498	$1,436	$849	$537	$490	$259	$1,340	$94	$186	$0	$7,640
JA - Administrative Division (Environmental Dept.)													
Labor -150					$6		$16		$25				$47
Labor True-up - 155					$1		$3		$4				$7
Overheads					$3		$11		$15				$29
	$0	$0	$0	$0	$10	$0	$30	$0	$44	$0	$0	$0	$83
YJ - Project Management Division (Power Supply Engineering Dept.)													
Labor -150			$42		$42								$83
Labor True-up - 155			$3		$5								$8
Overheads			$34		$37								$71
	$0	$0	$79	$0	$83	$0	$0	$0	$0	$0	$0	$0	$162
BT - Structural Division (Engineering Dept.)													
Outside Services - 501							$27,390	$339	$34,916	$18,692	$19,604	$784	$101,724
Mainland Travel - 520						$52		$510		$239			$801
Meals - 521						$6				$66			$72
	$0	$0	$0	$0	$0	$58	$27,390	$849	$34,916	$18,997	$19,604	$784	$102,598
Totals													
Labor -150	$213	$938	$340	$859	$542	$348	$289	$145	$767	$51	$102	$0	$4,595
Labor True-up - 155	$21	$85	$27	$13	$58	($18)	$48	$22	$123	$10	$11	$0	$401
Overheads	$132	$563	$210	$564	$341	$206	$183	$92	$493	$33	$72	$0	$2,889
Outside Services - 501	$0	$0	$0	$0	$0	$0	$27,390	$339	$34,916	$18,692	$19,604	$784	$101,724
Mainland Travel - 520	$0	$0	$0	$0	$0	$52	$0	$510	$0	$239	$0	$0	$801
Meals - 521	$0	$0	$0	$0	$0	$6	$0	$0	$0	$66	$0	$0	$72
	$366	$1,587	$577	$1,436	$942	$595	$27,910	$1,108	$36,299	$19,091	$19,789	$784	$110,483

Note: Totals may not add exactly due to rounding.

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HAWAIIAN ELECTRIC COMPANY INC.
2007 RATE CASE
Costs Incurred for 316(b) Work for the period Jan. - Apr. 2007
under workorder number HP002068 (Kahe PP - 316(b))

RA / Exp Element	Jan. 2007	Feb. 2007	Mar. 2007	Apr. 2007	Totals
JW - Water & Hazardous Materials Division (Environmental Dept.)					
Labor -150	$223	$288	$928	$306	$1,745
Labor True-up - 155	$12	($14)	$45	$14	$57
Overheads	$141	$174	$582	$182	$1,080
	$376	$449	$1,556	$502	$2,882
BT - Structural Division (Engineering Dept.)					
Outside Services - 501	$16,330	$13,029	$10,846	$59,831	$100,037
Mainland Travel - 520			$202	$119	$320
Meals - 521				$14	$14
	$16,330	$13,029	$11,048	$59,963	$100,371
JA - Administrative Division (Environmental Dept.)					
Labor -150		$51		$26	$77
Labor True-up - 155		($2)		$1	($1)
Overheads		$31		$16	$47
	$0	$80	$0	$43	$122
Totals					
Labor -150	$223	$339	$928	$332	$1,822
Labor True-up - 155	$12	($16)	$45	$15	$56
Overheads	$141	$205	$582	$197	$1,126
Outside Services - 501	$16,330	$13,029	$10,846	$59,831	$100,037
Mainland Travel - 520	$0	$0	$202	$119	$320
Meals - 521	$0	$0	$0	$14	$14
	$16,707	$13,557	$12,604	$60,508	$103,376

Note: Totals may not add exactly due to rounding.

INTEROFFICE CORRESPONDENCE

Hawaiian Electric Co., Inc.

April 3, 2007

To: Tayne Sekimura

From: Patsy Nanbu

Subject: Preliminary Engineering Workorder Charges for Clean Water Act Section 316(b) studies

Currently there are three workorders (one each for Kahe, Waiau and Honolulu power plant) in preliminary engineering for work related to the clean water act section 316 (b). Per discussion with Donn Fukuda, the costs in the preliminary engineering workorders include:

- Development of a strategic plan for how to approach compliance with Section 316(b) requirements;
- Preparation of a proposal for information collection and obtainment of necessary approvals from the State Department of Health;
- Collection of monitoring data for impingement and entrainment of marine life at the Honolulu, Waiau and Kahe power plants;
- Analysis of data, identification of technologies and alternatives, and evaluation of compliance options; and
- Development of a Comprehensive Demonstration Study (which includes baseline water and biological impact assessments, design and construction technology plans, technology installation and operation, alternatives demonstrations, and verification monitoring).

Background regarding Section 316(b)
In 2004, the Environmental Protection Agency (EPA) established national Clean Water Act Section 316(b) Phase II rules regulating the use of cooling water intake systems by large, existing power producing facilities, including HECO's Honolulu, Waiau and Kahe generating facilities. These regulations were intended to ensure that the location, design, construction and capacity of cooling water intake structures reflect the best technology available to protect aquatic organisms from being killed or injured by impingement or entrainment. Several compliance options were provided in the rule. However, based on a recent US Second Circuit Court of Appeals ruling on January 25, 2007, all available options were remanded to the EPA. Two of HECO's preferred compliance options (i.e., restoration alternative and a cost-benefit test) were declared impermissible. As a result, there is uncertainty as to what the ultimate requirements will be; but at this point a technology-based solution is probable, with closed cycle cooling being the default best technology available. EPA requested and was granted an extension by the Court to decide if it will appeal the decision or take its appeal to the Supreme Court. In the meantime, EPA just suspended the rule and instructed regulators to use Best Professional Judgment in managing Section 316(b) under Phase II facility permits.

4-17-07
cc DTF
KST

04-17-07A09:59 RCVD

The costs incurred to date, are primarily to develop a compliance strategy and gather information, and the actual project that will result from such information is not certain. The monitoring data is required for the design phase of the project.

Accounting Determination
The costs incurred to date are more consistent with general planning work to determine system requirements, and to determine the justification of a potential project. Under our capital project life cycle guidelines, work prior to preliminary engineering is defined as general planning work to determine overall system requirements. Work includes analyses, feasibility studies and investigations to determine if there is sufficient justification to propose potential projects. General planning costs should be charged to the appropriate clearing accounts and are allocated as an on-cost (overhead) charge to projects.

Costs incurred to date as follows:

Honolulu Power Plant (HP002066)	$198k
Waiau Power Plant (HP002067)	$244k
Kahe Power Plant (HP002068)	$207k
Total as of 3/29/07	$607k

Based on the above review of the description of the costs recorded in the above workorders, and the company's guidelines for accounting for capital project costs, the costs should be cleared through the on-cost process.

I propose that the costs included in the preliminary engineering workorders for the section 316(b) studies (workorders identified above) be reclassified out of the preliminary engineering workorders and reflected in the clearing accounts and cleared through the on-cost process. Please note your concurrence below.

Concur: Tayne Sekimura

cc: Tom Simmons
Tom Joaquin
Sherri-Ann Loo
Brenner Munger
Donn Fukuda
Steve Oppenheimer
Brenner Munger
Bruce Tamashiro
Nelson Watanabe

HAWAIIAN ELECTRIC COMPANY, INC.
2007 RATE CASE

316(b) PEWON Labor Estimates

_RA	_Act	_Loc	_Ind	_Proj	_EE	_LbrClass	Line item	FY07
PJW	211	HST	NP	NPJZZZZ	150	J_WHMSCI	Honolulu 316(b) Labor Hours	4,678.38
PJW	211	WST	NP	NPJZZZZ	150	J_WHMSCI	Waiau 316(b) - Labor Hours	4,678.38
PJW	211	KST	NP	NPJZZZZ	150	J_WHMSCI	Kahe 316(b) - Labor Hours	4,752.64
							Total Labor	$14,109.40
PJW	211	HST	NP	NPJZZZZ	406	J_WHMSCI		471.24
PJW	211	WST	NP	NPJZZZZ	406	J_WHMSCI		471.24
PJW	211	KST	NP	NPJZZZZ	406	J_WHMSCI		478.72
PJW	211	HST	NP	NPJZZZZ	421	J_WHMSCI		536.76
PJW	211	WST	NP	NPJZZZZ	421	J_WHMSCI		536.76
PJW	211	KST	NP	NPJZZZZ	421	J_WHMSCI		545.28
PJW	211	HST	NP	NPJZZZZ	422	J_WHMSCI		1,558.62
PJW	211	WST	NP	NPJZZZZ	422	J_WHMSCI		1,558.62
PJW	211	KST	NP	NPJZZZZ	422	J_WHMSCI		1,583.36
PJW	211	HST	NP	NPJZZZZ	423	J_WHMSCI		382.69
PJW	211	WST	NP	NPJZZZZ	423	J_WHMSCI		382.69
PJW	211	KST	NP	NPJZZZZ	423	J_WHMSCI		388.77
							Total Overheads	$8,894.75
							Total Labor & Overheads	$23,004.15

Hawaiian Electric Company, Inc.
2005 Rate Case Data
Non-Projects - Direct Non-Labor

RA	Prod Oper	Prod Maint	Total
PJA	69,940	0	69,940 ✓
PJB	1,067,827	0	1,067,827 ✓
PJC	140,430	0	140,430 ✓
PJW	335,580	0	335,580 ✓
Total	1,613,777	0	1,613,777

Environmental

CA-IR-2

General Information Requests

For each of the HECO witnesses who sponsor test period budgeted non-labor direct expense amounts, please provide the following information:

a. Identify each employee involved in preparation of budgeted non-labor direct expense amounts included in the rate case test period budget and sponsored by the witness.

b. Provide complete copies of all calculations, spreadsheet files, "pencil" workpapers, surveys and other analyses performed by each of the employees identified in response to part (a), indicating the amounts by Department, RA, Activity and NARUC Account that such calculations support.

c. For each budgeted non-labor amount in the test period forecast that exceeds $50,000, please describe the basis for determining the budgeted amount (for example, bid solicitation, price times quantity estimation, historical cost escalated, etc.)

d. For each item in your response to part (c), where specific quantities and prices were discretely forecasted, explain the basis for and source of the budgeted quantity inputs and budgeted prices for each such item. Provide complete copies of all studies, reports and other documents that were relied upon.

e. For each item in your response to part (c) where historical costs were escalated, provide all historical cost information that was considered and explain how such data was evaluated and escalated to derive test year proposed levels.

f. For each item in your response to part (c) where a bid solicitation or other special analysis was conducted, explain what was done and provide complete copies of all supporting reports, bid solicitations, proposal, analyses, workpapers and other documents associated with such efforts.

g. Provide complete copies of all other information required to completely support and document the test year projected expense levels being proposed by the Company, including general assumptions and forecasting instructions that were employed.

HECO Response:

a. For the Environmental Dept. the employees involved in the preparation of budgeted staffing and associated labor direct expense amounts included in the witnesses' portion of the rate case test period budget are Sherri-Ann Loo, Environmental Dept. Manager, Barry Nakamoto, Air Quality/Noise Division Principal Environmental Scientist, Doug Rinehart,

Chemistry Division Laboratory Supervisor, and Donn Fukuda, Water & Hazardous Materials Division Principal Environmental Scientist.

b. Back-up support workpapers will be sent via interoffice mail.

c. For the Air Quality/Noise Division $50,000 ($50K for Kahe, $50K for Waiau, and $25K forecasted for Honolulu) forecasted for outside consultants compliance assistance. These amounts were based on anticipated level of effort. In addition, PSD emission fee amounts ($484K for Kahe, $300K for Waiau and $36K for Honolulu) were based on fuel consumption forecast and emission fee calculations provided by DOH. PSW For the Water & Hazardous Materials Division, $75,000 ($75K for Kahe, Waiau & Honolulu) amounts are for a NPDES 316(b) Study. The estimates are based on a proposal received from EPRI plus additional amount for the collection of baseline data.

d. N/A

e. N/A

f. To be provided for NPDES 316(b) Study.

g. Back-up support workpapers will be sent via interoffice mail.

Environmental Dept

Non-Labor Dollars (For CA-IR-2) (NARUC 500-577)

*RA #	*Act #	*Loc #	*Ind #	*Project #	*EE #	Line item	FY05
PJA	_	_	_	_	462	Stores OHPJA	525
PJA	701	PHE	NE	NPJZZZZZ	600	Pacific Bus Machines-Canon - _TC	125
PJA	720	PHE	NE	NPJZZZZZ	301	Vehicle for Admin - JA	4,960
PJA	745	PHE	NE	NPJZZZZZ	508	Katz Environmental	10,000
PJA	789	PHE	NE	NPJZZZZZ	501	Corp Trend	3,200
PJA	789	PHE	NE	NPJZZZZZ	501	Training, Local	1,604
PJA	875	CNS	BE	NPJZZZZZ	522	HGA H13744 006 KEAHOLE AUDITS-TRIPS	204
PJA	**875**	**KST**	**NE**	**NPJZZZZZ**	**508**	**External Air Audit**	**23,172** ✓(A)
PJA	875	MHN	BE	NPJZZZZZ	522	MGM M11288 002	196
PJA	875	NST	BE	NPJZZZZZ	522	MGK M11289 005 TRIPS FOR AUDIT	204
PJA	**875**	**PHE**	**NE**	**NPJZZZZZ**	**201**	**Outside Materials Purchase-EN000020**	**1,200** ✓(A)
PJA	**875**	**PHE**	**NE**	**NPJZZZZZ**	**205**	**Materials Purchase Card**	**3,000** ✓
PJA	**875**	**PHE**	**NE**	**NPJZZZZZ**	**462**	**PC Software Purchase Dean 6/25/03**	**6,274** ✓
PJA	**875**	**PHE**	**NE**	**NPJZZZZZ**	**501**	**AT&T Cellular Phone Svc - EN000010**	**600**
PJA	**875**	**PHE**	**NE**	**NPJZZZZZ**	**501**	**GTE Pager EN000010**	**100** $2,10
PJA	**875**	**PHE**	**NE**	**NPJZZZZZ**	**501**	**Misc-Printing, utilities, membership fees/dues**	**1,400**
PJA	**875**	**PHE**	**NE**	**NPJZZZZZ**	**502**	**Outside Svcs, Legal**	**14,000** ✓(A)
PJA	**875**	**PHE**	**NE**	**NPJZZZZZ**	**520**	**SL-Mainland Travel**	**8,000** ✓
PJA	**875**	**PHE**	**NE**	**NPJZZZZZ**	**521**	**SL-Meals/Entertainment**	**940** ✓
PJA	**875**	**PHE**	**NE**	**NPJZZZZZ**	**600**	**Typewriter Contracts**	**125** ✓
PJA	875	RST	BE	NPJZZZZZ	522	HGA H13744 002	204
PJA	876	CNS	BE	NPJZZZZZ	522	HGA H13745 006	204
PJA	876	MNS	BE	NPJZZZZZ	522	MGM M11290 008 TRIPS FOR NPDES AUDIT	204
PJA	876	NST	BE	NPJZZZZZ	522	MGK M11289 006	204
PJA	**876**	**PHE**	**NE**	**NPJZZZZZ**	**205**	**Materials Purchase Card-EN000020**	**3,000** ✓(A)
PJA	**876**	**PHE**	**NE**	**NPJZZZZZ**	**600**	**Typewriter Contracts**	**125** ✓
PJA	877	HEL	BE	NPJZZZZZ	522	HGA H13671 003	396
PJA	877	MAU	BE	NPJZZZZZ	522	MDO M12442 002 TRIP FOR PCB AUDIT	204
PJA	877	MNS	BE	NPJZZZZZ	522	MGM M11290 007	204
PJA	877	NST	BE	NPJZZZZZ	522	MGK M11289 007 AUDIT TRIPS	204
PJA	877	SST	BE	NPJZZZZZ	522	HGA H13746 001 RCRA USED OIL AUDIT-TRIP	196
PJA	**878**	**HST**	**NE**	**NPJZZZZZ**	**508**	**UPDATE SEPT02 TRI AUDIT-HON**	**8,004** ✓(A)
PJA	878	MNS	BE	NPJZZZZZ	522	MGM M11290 009	204
PJA	878	NST	BE	NPJZZZZZ	522	MGK M11289 008 TRIPS FOR AUDITS	204
PJA	878	PST	BE	NPJZZZZZ	522	HGA H13748 003 AUDIT TRIPS	204
PJA	878	RST	BE	NPJZZZZZ	522	HGA H13748 002	204
PJA							93,794

$(A) = $69,940
Total PJA

HECO 2005 Rate Case
PJB Non-Labor Summary

Input sheet on next page.

RA	NARUC	EE	ABM	Loc	Dollars	Comments
PJB	506	508	865	KST	15,000 (B)	MACT support.
PJB	506	508	865	WST	27,000	Permit renewal application and MACT support.
PJB	506	501	875	HST	36,000	Emission fees. See attached worksheet.
PJB	506	501	875	KST	484,000	Emission fees. See attached worksheet.
PJB	506	501	875	WST	300,000	Emission fees. See attached worksheet.
PJB	506	508	875	HST	25,000	Outside consultant compliance assistance.
PJB	506	508	875	KST	50,000	Outside consultant compliance assistance.
PJB	506	508	875	WST	50,000	Outside consultant compliance assistance.
PJB	506	508	875	PHE	25,000	Outside consultant compliance assistance.
PJB	506	201	875	PHE	2,500 (B)	Miscellaneous material expenses.
PJB	506	301	875	PHE	5,976 *	Vehicles - Ford Truck, Trailer (units)
PJB	506	462	875	PHE	5,000 (I)	Software - Adobe, misc.
PJB	506	501	875	PHE	16,400 (B)	Training expenses, cell phones, pagers, prof. mem.
PJB	506921	508	865	PHE	25,000	General permit support. [redacted]
PJB	506	600	875	PHE	5,000 (B)	Janitorial services for Waiau lab.

* Hours = $26,457.84 (B)

(I) Revised to $5,469 (B)

Σ(B) = $1,067,827
Total PJB

NonLabor Input Sheet - NonProject/NonProgram
2005

Resp Area (RA) JB

Prepared by Barry Nakamoto

Dimension tab card						Units tab card												
Line Item	RA	Act	Loc	Ind	EE	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
						(enter Dollars or Vehicle Hours in "Units tab card")												
Waiau CSP Renewal		865	WST	NE	508	1,250	1,250	1,250	1,250	1,250	1,250	1,250	1,250	1,250	1,250	1,250	1,250	
Kahe CSP Renewal		865	KST	NE	508	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	
Misc. Permitting		865	PHE	NE	508	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	
Kahe Compliance		875	KST	NE	508	4,167	4,167	4,167	4,167	4,167	4,167	4,167	4,167	4,167	4,167	4,167	4,167	
Waiau Compliance		875	WST	NE	508	4,167	4,167	4,167	4,167	4,167	4,167	4,167	4,167	4,167	4,167	4,167	4,167	
Honolulu Compliance		875	HST	NE	508	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	
Misc. Compliance		875	PHE	NE	508	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	
Misc. Materials		875	PHE	NE	201	208	208	208	208	208	208	208	208	208	208	208	208	
Vehicles - Truck (units)		875	PHE	NE	301	333	333	333	333	333	333	333	333	333	333	333	333	
Vehicles - Trailer (units)		875	PHE	NE	301	165	165	165	165	165	165	165	165	165	165	165	165	
Software		875	PHE	NE	462	417	417	417	417	417	417	417	417	417	417	417	417	
Cell Phone		875	PHE	NE	501	100	100	100	100	100	100	100	100	100	100	100	100	
Cell Phone		875	PHE	NE	501	100	100	100	100	100	100	100	100	100	100	100	100	
Misc. prof. memberships		875	PHE	NE	501	208	208	208	208	208	208	208	208	208	208	208	208	
Pager		875	PHE	NE	501	25	25	25	25	25	25	25	25	25	25	25	25	
Subscriptions		875	PHE	NE	501	100	100	100	100	100	100	100	100	100	100	100	100	
Training expenses		875	PHE	NE	501	833	833	833	833	833	833	833	833	833	833	833	833	
Misc. Services - Janitorial		875	PHE	NE	509	417	417	417	417	417	417	417	417	417	417	417	417	

Hours Y

$16,400

HECO TY 2005 Rate Case
Non-Labor Input Workpapers
BMN 12/22/2004

201 – Miscellaneous materials expenses. Includes items such as supplies for offices, meetings, training, and other materials.

301 – Vehicles. Costs for use of Ford Pick-up and trailer for support of air monitoring operations.

462 – Software. Includes forecasts for purchase/licensing of Adobe software for recordkeeping and other miscellaneous software.

501 – Emission fees. Based on fuel consumption forecast and emission fee calculations provided by DOH. Additional workpapers provided. Note fees were waived in 2004 for 2003 operations.

501 – Expenses. Includes forecast for expenses related to attending technical training, communications (cell phones, pagers), and professional memberships and trade subscriptions.

508 – Outside consultant services. Based on estimates provided by consultant or estimated based on anticipated level of effort.

600 – Miscellaneous services. Forecast for janitorial services for the portion of the Waiau facilities assigned to the Air Division.

Facility	Emission Fee Paid in 2003	Total 2002 Heat Input (MMBtu)	Projected 2005 Heat Input (MMBtu)	% Increase in Heat Input 2002 - 2005	% Increase of DoH Fees from 2003 Rate	2005 Projected Emission Fee
Kahe	$445,047.89	32,526,904	34,323,387	5.52%	1.03%	$483,703
Waiau	$271,262.54	14,429,895	15,431,795	6.94%	1.03%	$298,958
Honolulu	$31,230.66	1,520,833	1,718,610	13.0%	1.03%	$36,349

Notes

1. 2002 heat input from 2003 Emission Fee Report for the units primary fuel (No. 6 fuel oil for all units except Waiau CT which is No. 2 fuel oil)
2. 2005 Projected heat input from e-mail dated 4/15/04 from Craig Shigeta to Barry Nakamoto.

pstotals2005JRpt1.xls
08/04/03

Hawaiian Electric Company, Inc.

2005 Production Simulation - (Report One)

Sales and Peak Forecast dated May 2003 - Approved June 30, 2003
Maintenance Schedule dated April 22, 2003
Fuel Prices from May 2003 Sales and Peak Forecast

Month	Mbtu Consumption					Net MWh Generation					Net Heat Rate
	Kahe	Waiau	Honolulu	Diesel	Total	Kahe	Waiau	Honolulu	Diesel	Total	
Jan	2,667,453	1,162,731	81,878	18	3,912,080	256,363	106,655	5,430	1	370,449	10,560
Feb	2,259,707	1,211,406	122,791	18	3,593,923	222,074	111,030	8,420	2	341,526	10,523
Mar	2,992,377	1,420,121	185,963	12,805	4,611,266	294,342	130,463	13,175	602	438,582	10,514
Apr	2,639,798	1,338,020	176,377	5,735	4,159,930	258,229	123,290	12,516	276	394,311	10,550
May	2,674,311	1,303,165	164,946	112	4,142,533	261,342	120,899	11,423	9	393,673	10,523
Jun	2,695,171	1,346,320	172,069	53	4,213,612	264,289	124,871	11,897	4	401,061	10,506
Jul	2,976,927	1,280,054	118,798	118	4,375,897	291,964	118,646	8,290	9	418,909	10,446
Aug	2,931,079	1,454,727	210,325	14,915	4,611,046	289,669	133,476	15,088	715	438,948	10,505
Sep	3,235,187	1,401,842	196,468	22,754	4,856,251	319,526	129,610	14,189	1,074	464,399	10,457
Oct	3,245,763	1,239,604	147,449	53	4,632,869	319,144	115,470	9,732	4	444,350	10,426
Nov	2,977,629	1,112,693	100,168	29	4,190,520	291,458	104,073	6,732	2	402,265	10,417
Dec	3,027,984	1,104,449	41,380	53	4,173,866	296,167	102,715	2,506	4	401,392	10,398
Total	34,323,387	15,375,134	1,718,610	56,661	51,473,792	3,366,567	1,421,198	119,398	2,702	4,909,865	10,484
	10,195	10,818	14,394	20,970	10,484	68.6%	28.9%	2.4%	0.1%	100.0%	
CHP					440,889					47,429	9,296
HECO w/CHP					51,914,682					4,957,294	10,472

Σ© = $140,430 total PJC (includes $30K in Bud Reyde, see 1a Page)

*RA #	*Act #	*Loc #	*Ind #	*Project #	*EE #	Line item	FY05	
PJC	_	_	_	_	462	Stores OHPJC	329	
PJC	10	OUT	BN	NPJZZZZZ	905	Non-utility Revenue	-3,384	
PJC	40	OUT	BN	NPJZZZZZ	501	General Excise Tax	144	
PJC	**241**	**HST**	**NE**	**NPJZZZZZ**	**201**	**HST FUEL OIL (G0000364)**	**1,044**	©
PJC	**241**	**KST**	**NE**	**NPJZZZZZ**	**201**	**KST FUEL OIL (G0000390)**	**2,220**	©
PJC	241	LNS	BE	NPJZZZZZ	201	MGL M07154 001 LANAI FUEL OIL (G0000489)	240	
PJC	241	MNS	BE	NPJZZZZZ	201	MGM M07156 001 MAALAEA FUEL OIL (G000046	1,260	
PJC	241	NST	BE	NPJZZZZZ	201	MGK M071534 001 KAHULUI FUEL OIL (G000044	516	
PJC	241	RST	BE	NPJZZZZZ	201	HGA H00249 001 HILL FUEL OIL (G0000424)	996	
PJC	**241**	**WST**	**NE**	**NPJZZZZZ**	**201**	**WST FUEL OIL (G0000376)**	**2,220**	©
PJC	349	HAH	BE	NPJZZZZZ	201	HDC H00641 001 HELCO TSF OIL (E0000766)	1,200	
PJC	349	MAU	BE	NPJZZZZZ	201	MDE M15915/002 MECO TSF OIL-DGA (E000077	276	
PJC	789	PHE	NE	NPJZZZZZ	501	ATTEND TRAINING (G0002898)	7,500	
PJC	876	CNS	BE	NPJZZZZZ	201	HGA H00285 001 KEAHOLE WASTEWATER (G0	528	
PJC	**876**	**HST**	**NE**	**NPJZZZZZ**	**201**	**HST WASTEWATER (G0000360)**	**3,192**	©
PJC	**876**	**HST**	**NE**	**NPJZZZZZ**	**508**	**Update June 01 - HST WASTEWATER (G000036**	**648**	©
PJC	**876**	**KST**	**NE**	**NPJZZZZZ**	**201**	**KST WASTEWATER (G0000384)**	**18,492**	©
PJC	**876**	**KST**	**NE**	**NPJZZZZZ**	**508**	**Update June 01 - KST WASTEWATER (G000038**	**648**	©
PJC	876	MNS	BE	NPJZZZZZ	201	MGM M00838 003 MAALAEA WASTEWATER (G0	3,000	
PJC	876	NST	BE	NPJZZZZZ	201	MGK M00386 003 KAHULUI WASTEWATER (G00	2,772	
PJC	**876**	**PHE**	**NE**	**NPJZZZZZ**	**201**	**Stationery Supplies**	**2,640**	$5,041 ©
PJC	**876**	**PHE**	**NE**	**NPJZZZZZ**	**201**	**Update July 02 - Wastewater QA/QC**	**2,400**	©
PJC	**876**	**PHE**	**NE**	**NPJZZZZZ**	**301**	**Vehicle**	**4,960**	©
PJC	**876**	**PHE**	**NE**	**NPJZZZZZ**	**462**	**PC Software**	**998**	$3,938 ©
PJC	**876**	**PHE**	**NE**	**NPJZZZZZ**	**462**	**Update August 01 - LIMS Software Maintenance**	**2,940**	©
PJC	**876**	**PHE**	**NE**	**NPJZZZZZ**	**508**	**DISPOSAL OF HAZARDOUS WASTE**	**1,800**	©
PJC	**876**	**PHE**	**NE**	**NPJZZZZZ**	**600**	**Laboratory Instrument Maintenance Contracts**	**33,300**	©
PJC	876	PST	BE	NPJZZZZZ	201	HGA H00286 000 PUNA WASTEWATER (G00004	540	
PJC	876	RST	BE	NPJZZZZZ	201	HGA H00288 001 HILL WASTEWATER (G000042	3,000	
PJC	876	SST	BE	NPJZZZZZ	201	HGA H00289 001 SHIPMAN WASTEWATER (G00	540	
PJC	**876**	**WST**	**NE**	**NPJZZZZZ**	**201**	**WST WASTEWATER (G0000384)**	**18,492**	©
PJC	**876**	**WST**	**NE**	**NPJZZZZZ**	**501**	**Update June 01 - Armstrong Bldg Maint Jan Svc**	**9,180**	©
PJC	**876**	**WST**	**NE**	**NPJZZZZZ**	**508**	**Update June 01 - WST WASTEWATER (G000037**	**648**	©
PJC	**877**	**HST**	**NE**	**NPJZZZZZ**	**508**	**Update June 01 - HST OIL-RELATED (G0000363**	**1,320**	©
PJC	**877**	**KST**	**NE**	**NPJZZZZZ**	**508**	**Update June 01 - KST OIL-RELATED (G0000386**	**648**	©
PJC	877	MAU	BE	NPJZZZZZ	201	MDE M15915/001 MECO TSF OIL-PCB (E0008355	804	
PJC	**877**	**WST**	**NE**	**NPJZZZZZ**	**508**	**Update June 01 - WST OIL-RELATED (G0000374**	**2,640**	©
PJC							130,691	
PJW	_	_	_	_	462	Stores OHPJW	110	
PJW	788	CNS	BE	NPJZZZZZ	522	HGA H13741 003	470	
PJW	788	HEL	BE	NPJZZZZZ	522	HDE H18794 001	940	
PJW	788	MAL	BE	NPJZZZZZ	522	M15316 006 - Conduct Training Lanai	380	
PJW	788	MAM	BE	NPJZZZZZ	522	M15317 005 - Conduct Training Palaau	380	
PJW	788	MAU	BE	NPJZZZZZ	522	M15885 003 - Conduct Training ED	940	
PJW	788	MPO	BE	NPJZZZZZ	521	M15314 010 - Conduct Training Maalaea	160	
PJW	788	MPO	BE	NPJZZZZZ	522	M15313 009 - Conduct Training Kahului	940	
PJW	788	MPO	BE	NPJZZZZZ	522	M15314 010 - Conduct Training Maalaea	1,420	
PJW	788	PST	BE	NPJZZZZZ	521	HGA - Conduct Training	190	
PJW	788	RST	BE	NPJZZZZZ	522	HGA H18840 001	570	
PJW	788	SST	BE	NPJZZZZZ	521	HGA H18840 004	570	

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Σ(W) = $335,580
Total PJW

*RA #	*Act #	*Loc #	*Ind #	*Project #	*EE #	Line item	FY05	
PJW	876	BNS	BE	NPJZZZZZ	522	HGA H18945 005	235	
PJW	876	CNS	BE	NPJZZZZZ	201	HGA H18945 006	150	
PJW	876	CNS	BE	NPJZZZZZ	522	HGA H18945 006	2,550	
PJW	876	CNS	BE	NPJZZZZZ	522	HGA H18945 006	940	
PJW	876	HEL	BE	NPJZZZZZ	522	HDE H18794 002	235	
PJW	**876**	**HST**	**NE**	**NPJZZZZZ**	**201**	**WETT & ZOM Monitoring - HONOLULU**	**500**	(W)
PJW	**876**	**HST**	**NE**	**NPJZZZZZ**	**508**	**BBCM - Honolulu**	**4,000**	
PJW	**876**	**HST**	**NE**	**NPJZZZZZ**	**508**	**NPDES 316(b) Study**	**75,000**	$96,600 (W)
PJW	**876**	**HST**	**NE**	**NPJZZZZZ**	**508**	**WET TEST EXTRA ANALYSIS**	**6,000**	
PJW	**876**	**HST**	**NE**	**NPJZZZZZ**	**508**	**WETT - HONOLULU**	**1,600**	
PJW	**876**	**KST**	**NE**	**NPJZZZZZ**	**201**	**WETT, Sand and Coral Monitoring - KAHE**	**500**	(W)
PJW	**876**	**KST**	**NE**	**NPJZZZZZ**	**508**	**NPDES 316(b) Study**	**75,000**	
PJW	**876**	**KST**	**NE**	**NPJZZZZZ**	**508**	**WET TEST EXTRA ANALYSES**	**12,000**	$104,820 (W)
PJW	**876**	**KST**	**NE**	**NPJZZZZZ**	**508**	**WETT & Coral Study - KAHE**	**17,820**	
PJW	876	MNS	BE	NPJZZZZZ	201	MGM M19147 005	100	
PJW	876	MNS	BE	NPJZZZZZ	521	MGM M19147 005	150	
PJW	876	MNS	BE	NPJZZZZZ	522	MGM M19147 005	1,700	
PJW	876	MNS	BE	NPJZZZZZ	522	MGM M19147 005 - Compliance	1,410	
PJW	876	NST	BE	NPJZZZZZ	201	MGK M19146 005	200	
PJW	876	NST	BE	NPJZZZZZ	521	MGK M19146 005	480	
PJW	876	NST	BE	NPJZZZZZ	522	MGK M19146 005	3,000	
PJW	876	NST	BE	NPJZZZZZ	522	MGK M19146 005 - Compliance	1,410	
PJW	**876**	**PHE**	**NE**	**NPJZZZZZ**	**301**	**Vehicle, Assigned - Boat Trailer**	**11,960**	$23,920 (W)
PJW	**876**	**PHE**	**NE**	**NPJZZZZZ**	**301**	**Vehicle, Assigned - Van**	**11,960**	
PJW	**876**	**PHE**	**NE**	**NPJZZZZZ**	**501**	**Cellular Phone Svc - AT&T (4)**	**1,200**	
PJW	**876**	**PHE**	**NE**	**NPJZZZZZ**	**501**	**Misc - Printing, Utilities, Membership Fees/Dues**	**1,200**	$3,940 (W)
PJW	**876**	**PHE**	**NE**	**NPJZZZZZ**	**501**	**Pager - GTE (4)**	**540**	
PJW	**876**	**PHE**	**NE**	**NPJZZZZZ**	**520**	**Mainland Travel - Airfare, Hotel**	**2,000**	(W)
PJW	**876**	**PHE**	**NE**	**NPJZZZZZ**	**521**	**Meals/Entertainment**	**300**	
PJW	876	PST	BE	NPJZZZZZ	201	HGA H18945 003	50	
PJW	876	PST	BE	NPJZZZZZ	522	HGA H18945 003	570	
PJW	876	PST	BE	NPJZZZZZ	522	HGA H18945 003	235	
PJW	876	RST	BE	NPJZZZZZ	201	HGA H18845 002	150	
PJW	876	RST	BE	NPJZZZZZ	522	HGA H18845 002	1,520	
PJW	876	RST	BE	NPJZZZZZ	522	HGA H18845 002	1,410	
PJW	876	SST	BE	NPJZZZZZ	201	HGA H18945 001	1,100	
PJW	876	SST	BE	NPJZZZZZ	522	HGA H18945 001	760	
PJW	876	SST	BE	NPJZZZZZ	522	HGA H18945 001	705	
PJW	**876**	**WST**	**NE**	**NPJZZZZZ**	**201**	**WETT & ZOM Monitoring - WAIAU**	**500**	(W)
PJW	**876**	**WST**	**NE**	**NPJZZZZZ**	**508**	**BBCM - Waiau**	**4,000**	
PJW	**876**	**WST**	**NE**	**NPJZZZZZ**	**508**	**NPDES 316(b) Study**	**75,000**	$103,000 (W)
PJW	**876**	**WST**	**NE**	**NPJZZZZZ**	**508**	**WET TEST EXTRA ANALYSIS**	**18,000**	
PJW	**876**	**WST**	**NE**	**NPJZZZZZ**	**508**	**WETT Monitoring - WAIAU**	**6,000**	
PJW	877	BNS	BE	NPJZZZZZ	522	HGA H18844 005	470	
PJW	877	CNS	BE	NPJZZZZZ	522	HGA H18844 006	1,175	
PJW	877	GNS	BE	NPJZZZZZ	522	MGT M19151 005	705	
PJW	877	HEL	BE	NPJZZZZZ	508	HDE H18794 003	470	
PJW	**877**	**HST**	**NE**	**NPJZZZZZ**	**201**	**Supplies**	**500**	(W)
PJW	**877**	**HST**	**NE**	**NPJZZZZZ**	**508**	**NPREP Drill**	**3,000**	
PJW	**877**	**KST**	**NE**	**NPJZZZZZ**	**201**	**Supplies**	**500**	
PJW	**877**	**KST**	**NE**	**NPJZZZZZ**	**508**	**NPREP Drill**	**3,000**	

*RA #	*Act #	*Loc #	*Ind #	*Project #	*EE #	Line item	FY05
PJW	877	LNS	BE	NPJZZZZZ	522	MGL M19149 003	705
PJW	877	MAU	BE	NPJZZZZZ	508	MDE M15885 001	6,000
PJW	877	MAU	BE	NPJZZZZZ	522	MDE M15885 001	1,410
PJW	877	MNS	BE	NPJZZZZZ	521	MGM M19147 006	80
PJW	877	MNS	BE	NPJZZZZZ	522	MGM M19147 006	1,250
PJW	877	NST	BE	NPJZZZZZ	521	MGK M19146 006	120
PJW	877	NST	BE	NPJZZZZZ	522	MGK M19146 006	1,560
PJW	877	PDM	NE	NPJZZZZZ	508	SPCC Consulting	2,000
PJW	877	PDO	NE	NPJZZZZZ	508	SPCC Consulting	2,000
PJW	877	PHE	NE	NPJZZZZZ	301	Vehicle, Assigned - Ford Explorer	11,960
PJW	877	PHE	NE	NPJZZZZZ	462	PC Software	1,313
PJW	877	PHE	NE	NPJZZZZZ	501	Cellular Phone Svc - AT&T (2)	700
PJW	877	PHE	NE	NPJZZZZZ	501	Pager - GTE (2)	280
PJW	877	PHE	NE	NPJZZZZZ	520	Mainland Travel - Airfare, Hotel	2,000
PJW	877	PHE	NE	NPJZZZZZ	521	Meals/Entertainment	300
PJW	877	PST	BE	NPJZZZZZ	522	HGA H18844 003	190
PJW	877	PTM	NE	NPJZZZZZ	508	SPCC Consulting	2,000
PJW	877	PTO	NE	NPJZZZZZ	508	SPCC Consulting	2,000
PJW	877	RST	BE	NPJZZZZZ	521	HGA H18844 002	80
PJW	877	RST	BE	NPJZZZZZ	522	HGA H18844 002	735
PJW	877	SST	BE	NPJZZZZZ	521	HGA H18844 001	80
PJW	877	SST	BE	NPJZZZZZ	522	HGA H18844 001	1,250
PJW	**877**	**WST**	**NE**	**NPJZZZZZ**	**201**	**Supplies**	**500**
PJW	**877**	**WST**	**NE**	**NPJZZZZZ**	**508**	**NPREP Drill**	**3,000**
PJW	878	BNS	BE	NPJZZZZZ	522	HGA H18847 005	235
PJW	878	CNS	BE	NPJZZZZZ	522	HGA H18847 006	235
PJW	878	GNS	BE	NPJZZZZZ	522	MGT M15317 004	235
PJW	878	HEL	BE	NPJZZZZZ	522	HDE H18794 004	470
PJW	878	LNS	BE	NPJZZZZZ	522	MGL M15316 005	235
PJW	878	MAU	BE	NPJZZZZZ	522	MDE M15885 002	705
PJW	878	MNS	BE	NPJZZZZZ	522	MGM M19147 007	235
PJW	878	NST	BE	NPJZZZZZ	522	MGK M19146 007	235
PJW	878	PHE	NE	NPJZZZZZ	520	Mainland Travel - Airfare, Hotel	2,000
PJW	878	PHE	NE	NPJZZZZZ	521	Meals/Entertainment	300
PJW	878	PST	BE	NPJZZZZZ	522	HGA H18847 003	190
PJW	878	RST	BE	NPJZZZZZ	522	HGA H18847 002	190
PJW	878	SST	BE	NPJZZZZZ	522	HGA H18847 001	190
PJW							407,997

2005 Budget Recycle
4/15/04

Code Block	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TTL	Comments
PIX 260 WST NE NPIZZZZZ 201	-1,500	-40,000	-85,000				-22,500	-40,000	-25,000				-214,000	WAI Genl Trend, CWP OH, Cond Scrapers.
PIX 259 WST NE NPIZZZZZ 201		-10,000			-10,000			-10,000			-10,000		-40,000	WAI Genl Trend, Burner Tips.
PIX 262 WST NE NPIZZZZZ 201	-7,500						-7,500						-15,000	WAI Genl Trend
PIN 878 HST NE NPIZZZZZ 501		-2,000	-25,000		-2,000			-2,000	-25,000			-2,000	-58,000	HON Asb, Haz, Lead, Mercury Disposal
PIN 265 HST NE NPIZZZZZ 501												2,500	2,500	HON A/C Rprs
PIN 266 HST NE NPIZZZZ 501									-5,000				-5,000	HON H8/9 Crane Certification
PIN 262 HST NE NPIZZZZZ 501	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-6,000	HON Con Clean
PIN 259 HST NE NPIZZZZZ 201					8,000		75,000						83,000	HON BFP OH, Burner Tips.
PIL 878 KST NE NPIZZZZZ 501			-6,000			4,000			-1,000			4,000	1,000	KAH Haz, Lead, Marcury, Asb, Waste Oil Disp
PIL 875 KST NE NPIZZZZZ 501	1,167	1,167	1,167	1,167	1,167	1,167	1,167	-23,833	11,167	1,167	1,167	1,167	-996	KAH K6 CEMS
PIL 265 KST NE NPIZZZZZ 501				-73,000	-15,000	-10,000		-10,000	-10,000		50,000		-68,000	KAH Struct Paintg, Turb Deck Rprs, Corr Ctrl, Culvert Drain, Intake Bar Grills, Demin Struct, A/C Duct Clean.
PIL 262 KST NE NPIZZZZZ 501				-13,000						25,000			12,000	KAH Basin Dredging.
PIL 260 KST NE NPIZZZZZ 501						-20,000							-20,000	KAH CWP OH.
PIL 266 KST NE NPIZZZZZ 501			-4,000							-4,000	-3,000		-11,000	KAH Drott Maint, Gantry Crane Inspect/Cert.
PIL 257 KST NE NPIZZZZZ 201							70,000						70,000	KAH BFP OH
PIL 260 KST NE NPIZZZZZ 201									-5,000				-5,000	KAH Cond Pump OH
PIL 259 KST NE NPIZZZZZ 201		-5,000			-5,000			-5,000			-5,000		-20,000	KAH Burner Tips
PIL 262 KST NE NPIZZZZZ 201			-23,000				20,000			-5,000			-8,000	KAH Tvl Screen OH, Cond Scrapers, Tvl Screen Wash.
Total PRODUCTION													**489,504**	
ENVIRONMENTAL														
PJC 878 WST NE NPJZZ 150 _WHMAID													100,000	Chem Lab Staffing: Add 1 Clerk JC. $100K
PJC 878 WST NE NPJZZZZZ 501													30,000	Chem Lab Renovation: Add $30K (c)
Total ENVIRONMENTAL													**130,000**	

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SOLUTIONS CONTRIBUTING TO
THE SUCCESS OF OUR CUSTOMERS

EPRI SOLUTIONS

July 15, 2004

Mr. Kirk Tomita
HECO

via electronic mail

Subject: **RFP for 316(b) Compliance Support for HECO**

Dear Kirk:

We are very pleased to enclose our proposal for providing 316(b) Compliance Support for three of HECOs's facilities, Kahe, Waiau and Honolulu. We have provided prices as requested for our Options 3. EPRIsolutions in partnership with Alden Research Laboratories and ASA has assembled a unique and deeply experienced team that has been actively engaged in the 316(b) rule development, conducted many preliminary assessments for facilities based on the proposed rule, and now is providing strategic compliance planning assessments based on the final 316(b) Phase II regulations. As we submit this proposal for your consideration, we would like to make the following points:

1. Our scope of work is based on our recent experience in performing exactly the type of compliance efforts that HECO needs for numerous other utility companies. We have worked at over 80 power plants located throughout the U.S. on all waterbody types. Our clients have found that our approach meets all of their 316(b) compliance needs.
2. Our price, which we believe to be very competitive, is based on a realistic assessment of the complexity of the proposed rule and the steps that will best meet your strategic and financial goals. In addition, HECO TC funds can be used for this work although it is our understanding you have elected not to use them for this project.
3. The work you have requested offers a thoughtful and systematic compliance assessment approach and provides HECO an excellent opportunity to reduce future compliance costs. We fully intend to work with you and your staff to make use of the depth and breadth of HECO's experience to ensure the best possible product.
4. Our team has extensive experience working with regulatory agencies responsible for 316(b) permitting. Through multiple past projects, we have developed solid relationships with federal agency staff and successfully earned their respect. As State regulators continue to increase number of complex compliance options available under the final Phase II Rule, the experience of this team will be an asset to HECO.

Environment Division
1299 4th Street | Ste 307 | San Rafael CA 94901 USA | 415.454.8800 | Fax 415.454.8012
EPRIsolutions, Inc., A SUBSIDIARY OF EPRI
3412 Hillview Avenue | Palo Alto CA 94304-1395 USA | 650.855.2000 | Customer Service 800.313.3774 | www.eprisolutions.com

5. We have full capability to provide HECO with additional services for follow on work that is likely to be required after the assessment studies requested in the current RFP are complete.

We invite your close review of the material submitting; it reflects the dedication of our staff and contractors who have spent much of their careers working exclusively on understanding and providing solutions to issues presented by Section 316 of the Clean Water Act. We are very proud of our team and welcome your questions. Thank you for the opportunity to provide this proposal.

Sincerely,

David E. Bailey
Associate Director, Clean Water Act Programs

Cc: Mr. Donn Fukuda
Mr. Mr. Mike Carberry

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PROPOSAL FOR SERVICES

Project Title:
316(b) Compliance Strategy for Cooling Water Intake Structures
(Option 3)

Proposal 221080

Submitted to:
Hawaiian Electric Company (HECO)
Kirk Tomita
July 15, 2004

Point of Contact:
David Bailey, EPRIsolutions
Telephone: 571-643-2320
Email: dbailey@eprisolutions.com

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EPRI SOLUTIONS ALDEN Solving Flow Problems Since 1894 ASA

1 INTRODUCTION

The Clean Water Act calls for the Environmental Protection Agency (EPA) to establish the best technology available to protect fish, shellfish and other forms of aquatic life. On February 16, 2004, EPA established location, design, construction and capacity standards for cooling water intake structures at large power plants. The EPA Phase II § 316 (b) regulations (Rule) for existing utility intake structures requires all existing power plants that withdraw over 50 MGD of cooling water from a designated water of the United States to meet flexible "best technology available" (BTA) standards.

EPA's final § 316 (b) Phase II rule requires all existing power plants to meet technology based standards by reducing impingement 80 to 95% and if applicable a requirement to reduce entrainment by 60 to 90%. However, there is considerable flexibility in terms of compliance options.

The Rule requires all existing power plants to reduce impingement losses by 80% to 95% and many facilities to meet entrainment reduction performance standards of 60% to 90%. Optimizing a corporate strategy for complying with the Rule requires a thorough understanding of regulatory, ecological, and technological components of the Rule.

EPRIsolutions, Alden Research Laboratory, Inc. (Alden) and ASA Analysis & Communications, Inc. (ASA) have joined together to provide the industry's most experienced and qualified team available for addressing §316 (b) compliance issues. Our Team includes national experts in the fields of engineering, biology, and policy regulations. We have developed a six-step approach that will ensure that HECO's needs are met in a cost-effective manner. For a more detailed description of our capabilities and approach, please refer to our "Statement of Experience and Qualifications" document.

The EPRIsolutions, Alden, ASA partnership produced the industry's most qualified team for addressing 316(b) compliance issues.

2 PROJECT DESCRIPTION

Project Need

HECO has requested that the Team perform the initial work required to cost-effectively comply with the Rule by making use of the regulatory flexibility provided by the Rule. Specifically, the Team will develop strategic compliance plans based on alternative fish protection technologies, prepare the Proposal for Information Collection, provide HECO with budget estimates to comply, and complete the Comprehensive Demonstration Study. The preliminary information provided by HECO indicates that Kahe, Waiau, and Honolulu are required to meet both the impingement mortality and entrainment (IM&E) reduction standards.

HECO has 3 facilities subject to 316(b) requirements.

The facilities to be evaluated in this proposal include:

FACILITY NAME	WATERBODY
Kahe generating station	Pacific Ocean
Waiau generating station	Pearl Harbor, Pacific Ocean
Honolulu generating station	Honolulu Harbor, Pacific Ocean

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Project Goals

The Team will provide HECO with:

1. **A Cost-Effective Compliance Strategy** – Each facility will be evaluated to develop the most cost-effective §316(b) compliance strategy. The Rule provides a variety of options for achieving compliance, as well as collecting and developing the necessary supporting information. This project will utilize the Rule's flexibility to develop a compliance approach that uses the most cost-effective compliance plan and data collection requirements to support that plan.
2. **A Preliminary Assessment of Technologies and/or Operational Measures** – The Rule is technology based. All of the options require an examination of intake design and operational measures at some level to demonstrate fish and shellfish will be protected in conformance with applicable performance standards. Most of the options require a detailed evaluation of alternative technological and/or operational measures that will allow HECO to determine the feasibility, effectiveness, and cost for of fish protection technologies and/or operational measures for compliance. Because several options include use of restoration as an alternative means of compliance, use of such measures are also considered in the evaluation. The results of this assessment will provide the basis for the overall compliance strategy.
3. **A Proposal for Information Collection** – The first element of the Comprehensive Demonstration Study (CDS) is the Proposal for Information Collection (PIC). This proposal must be submitted prior to initiation of on-site studies. The Team will assist HECO in developing the information to satisfy the requirements of the PIC.
4. **Regulatory Agency Negotiation Support** – The Team will support HECO in meetings with the State permitting authority and other appropriate resource agencies to discuss the HECO's compliance approach and PIC.
5. **An Estimate of §316(b) Compliance Costs** – We will develop budgetary cost estimates to perform permitting activities subsequent to submission of the PIC, including recommended studies and other components of the Comprehensive Demonstration Study (CDS). The preliminary assessment of tech-

This work will provide HECO with:

- A Cost-Effective Compliance Strategy.
- A Preliminary Assessment of Technologies and/or Operational Measures.
- An Estimate of 316(b) Compliance Costs.
- Agency Negotiation Support (optional)

and will address the following EPA requirements:

- Best Professional Judgment Analysis (BPJ) of alternative fish protection options
- Identify opportunities for credit against the Calculation Baseline
- Reveal options for the Impingement Mortality and Entrainment Characterization Study (IM&E)
- Provide information to develop the Proposal for Information Collection (PIC)

nologies and/or operational measures, as well as restoration measures will provide HECO with an estimate of the approximate cost for each compliance option.

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Methodology

The approach used in this proposal allows HECO to complete all necessary work for cost-effective strategy planning and budgeting. This work will be implemented through the six (6) tasks discussed below.

Task 1 – Review of Facility Information and Site Visits

The main focus of Task 1 will be to understand the site-specific conditions of each facility through a preliminary review of the available facility information and a site visit. The task will consider the current intake configuration, operation and maintenance. Any fish protection technologies or operational measures currently being used to reduce impingement mortality and entrainment will be evaluated to determine whether credit is available to at least partially meet the Rule's performance standards. This task will also include a review of available data on the source waterbody, the fish and shellfish community in the vicinity of the plant intake, and previously collected impingement and entrainment data.

During the site visit at each facility a meeting will be held with appropriate HECO personnel for the purpose of directly observing and understanding facility operations relevant to the cooling water intake structure (CWIS) and cooling system evaluation. Any questions concerning the approach and permitting process for this project will also be addressed.

Our condensed methodology includes six (6) main Tasks:

- Review facility information and visit sites.
- Conduct preliminary assessment of technologies and operational measures.
- Prepare Strategic Compliance Plan.
- Prepare PIC.
- Report results.
- Support agency meetings and communication.

The goal of Task 1 is to understand the site-specific conditions of each facility and clarify any questions raised by the review of facility information.

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Prior to the site visits, HECO will provide the key information listed below for review. A detailed checklist of all the information required from HECO is provided in the Supplement section of this proposal. We assume that all data listed in the detailed checklist will be available for each facility at the start of Task 1. The general categories of information required are:

1) Information Provided to EPA to Support Their Phase II Rule Development
2) Circulating Water System
3) Cooling Water Intake Structure
4) Circulating Water Pumps
5) Condenser Data
6) Facility Operations
7) Biological Data
8) Restoration Data

We recognize that, in some cases, not all of the information will be available. However, as much of the information as possible should be provided. Any critical piece of missing information will be discussed with HECO prior to or during the site visit.

In order to maximize Task 1, each facility will need to provide information on the following topics:

- Information Provided to EPA to Support Their Phase II Rule Development
- Circulating Water System
- Cooling Water Intake Structure (CWIS)
- Circulating Water Pumps
- Condenser Data
- Facility Operations
- Biological Data
- Restoration Data

Task 2 –Preliminary Assessment of Technologies and Operational Measures

Task 2 will provide HECO with basic information necessary to formulate the strategic compliance plan in Task 3 of this scope of work. Task 2 will identify potential issues related to the existing design, location and operation of the cooling water intake structure that could affect feasibility, effectiveness and cost relative to the Rule's compliance options at the beginning of the §316(b) permitting process. In addition, we will identify the extent of the potential costs associated with installation of fish protection technologies and/or operational measures and the expected range of permitting costs for the facility.

The goal of Task 2 is to provide each facility with basic information necessary to formulate the Strategic Compliance Plan (Task 3).

The evaluation of available technological alternatives will emphasize the technologies that EPA used as a basis for defining the performance standards for impingement mortality and entrainment

(IM&E) reduction. These include coarse or fine mesh Ristroph traveling screens, coarse or fine mesh wedgewire screens, artificial filter barriers, and barrier nets. In addition, the Team will evaluate technologies that might meet the performance standards but were not identified by EPA. The results of Task 2 will be summarized in a confidential letter to HECO.

The information developed in Task 2 is critical to developing a Strategic Compliance Strategy and the EPA required Proposal for Information Collection (PIC), and will supply a Best Professional Judgment (BPJ) analysis as to the feasibility, effectiveness, and cost of alternative fish protection technologies.

The "Best Professional Judgment" (BPJ) analysis presented in this letter will be adequate for:

- assessing potential use of the Cost-Cost test for requesting a site-specific determination of BTA, by providing engineering cost estimates for feasible technologies and comparing them to the costs EPA considered when formulating the Rule (Appendix A and B);
- providing the cost basis for consideration of using the Cost-Benefit test as a basis for requesting a site-specific determination of BTA;
- provide the engineering information to support that technologies and/or operational measures are less feasible, cost effective or environmentally desirable than use of restoration;
- identifying alternative cost-effective technology or operational measures for complying with the Rule, including use of the "fast track" compliance option;
- being included in a PIC as a basis for identifying the technologies and or operational measures to be evaluated.

Costs for the technology alternatives will be based on Alden's database for installation of intake technologies at similar projects.

The information developed in Task 2 is critical to the development of a Strategic Compliance Strategy as well as the PIC.

The goal of Task 3 is to develop a customized Strategic Compliance Plan that maximizes the flexible options for complying with the 316(b) rule.

Task 3 – Develop Strategic Compliance Plan

The §316(b) Phase II Rule provides facilities with flexibility for achieving compliance and providing the necessary information to support the CDS. Information provided by HECO, the site visit, and the results of the analysis of alternative fish protection technologies and/or operational measures in Task 2 will be used as a basis for developing the Strategic Compliance Plan. The plan will consider all of the compliance options, identify opportunities for

credit against the "calculation baseline" and cost effective approaches for the "IM&E Characterization Study". The Strategic Compliance Plan for each facility will consider the following aspects of the Rule:

- **Five options for compliance:**

1. Demonstrating flows commensurate with wet closed-cycle cooling or a maximum design intake through-screen velocity of 0.5 ft/sec for impingement.
2. Demonstrating that technologies, operational measures, and/or restoration measures have been implemented to meet the performance standards.
3. Proposing installation of technologies, operational measures, and/or restoration measures that will meet the performance standards.
4. Proposing use of EPA-approved design and construction technology.
5. Demonstrating that the facility qualifies for site-specific standards by satisfying the requirements of either the Cost-Cost Test or Cost-Benefit Test.

- **Four possible alternatives for providing Impingement Mortality and Entrainment Characterization Study (IM&E Study)**

1. Use of historical data
2. New impingement and/or entrainment studies
3. Use of source waterbody biological data
4. Use of data from another facility that can be demonstrated to be appropriate for the facility evaluated

The strategic assessment will consider these four alternatives for the IM&E study in order to recommend the most cost-effective approach for completing this component of the CDS. The strategy will fully consider opportunities to avoid costs of new studies. However, care will be taken to ensure that adequate data are collected to demonstrate performance standards compliance, while still providing the data required for the verification study or restoration monitoring after compliance measures are implemented.

- **The technologies and/or operational measures identified**
The Strategic Compliance Plan will address the fish protection technologies and/or operational measures identified in Task 2 and their associated effectiveness and estimated costs. It will also address the results of a Cost-Cost Test using EPA cost estimates for the facility, as provided in Appendices A and B of the Rule.

- **Use of restoration measures**
The strategic evaluation will consider the use of restoration measures as the sole means of compliance or in combination with other compliance options, unless this option is eliminated as a result of litigation of the Rule regarding the use of restoration for compliance.

- **Use of the Cost-Benefit Test**
Based on the estimated biological benefits and the costs derived for each of the alternative fish protection technologies developed in Task 2, the compliance plan will evaluate use of the cost-benefit test. Even if existing IM&E data are available, the evaluation will consider recommendations and associated costs for collection of the necessary information to fully evaluate the Cost-Benefit approach.

- **Options for demonstrating compliance:**
1. Demonstrating compliance with the performance standards
2. Demonstrating compliance with the Technology Design and Construction Plan and the Technology Installation and Operation Plan.

The strategic compliance plan will identify any information gaps that must be addressed to reduce uncertainty associated with the use of cost-effective technology and/or operational measures and/or use of restoration measures. The plan will recommend the nature of biological and/or technology evaluation studies that should be considered for inclusion in the PIC.

A draft compliance plan will be prepared for review and comment. Based on HECO'S comments, a final compliance plan document will be prepared for each facility.

The Strategic Compliance Plan will identify the most cost effective compliance strategy utilizing the technologies, operational options, and restoration measures appropriate for each of HECO's facilities.

The strategic compliance plan will include cost estimates and multi-year budgets to:

1) Implement technology and/or operational measures needed to meet the selected compliance alternative as developed in Task 2;
2) Prepare and Implement the Comprehensive Demonstration Study Plan as recommended in Task 3;
3) Implement the Verification Monitoring Plan; and,
4) Meet the record keeping and reporting requirements.

The strategic plan will also provide a multi-year schedule to implement the §316(b) requirements based on the strategic compliance plan. First, a general schedule for overall compliance will be developed to provide HECO with a framework and schedule to achieve compliance. A facility-specific schedule will also be developed based on the strategic compliance approach developed for that facility.

Task 4 - Prepare Proposal for Information Collection

The PIC is the first element of the CDS. The PIC is required to be submitted to the NPDES permitting authority for their review and comment prior to the applicant initiating any studies. The four components required for submittal in the PIC include:

The goal of task 4 is to prepare the proposal for information collection.

1. A description of proposed or implemented technologies and/or operational measures, and/or restoration measures to be evaluated.
2. A description of historical IM&E studies and biological conditions in the vicinity of the intake and their relevance to any proposed studies. If existing data are to be used, it must be demonstrated that such data are representative of current conditions and that the data were collected using appropriate QA/QC procedures.
3. A summary of past, ongoing, or voluntary consultations with appropriate state or federal agencies that are relevant to the study and any written comments received from such agencies.
4. Sampling plans for any new studies to develop scientifically valid estimates of IM&E for each facility. The plan must include QA/QC procedures, analytical meth-

ods to be used, methods used in other studies in the source waterbody, a description of the study area (including area of influence of the CWIS) and taxonomic identifications for all life stages and species of fish and shellfish to the extent known prior to sampling.

In addition, if Cost-Benefit analyses are to be conducted, the proposal must identify methods that will be used for valuation of benefits and details of impingement and/or entrainment survival studies, if such studies are proposed. Unless directed otherwise, we will use a benefits transfer approach. That is, we will attempt to find existing studies that deal with situations and species similar to the ones relevant to us. These values will be updated and adjusted for relevant factors such as inflation. If during the PIC, the situation should arise that more precision is necessary, then we would develop another proposal that would, in all likelihood, require sampling the general population and anglers. The cost of a study of this nature depends on the extent of the population studied but would undoubtedly be in excess of the cost of the benefit transfer approach. Use values of commercially and recreationally species will be based on the following process:

1.) Assess the general magnitude of the reduced mortalities by species and the overall increase in societal harvest/catch that will result from it. The changes will include both the direct mortality effects and the indirect effects caused by reduced mortality of forage fish.
2.) Determine which of the species are likely caught by recreational anglers or commercial fishermen.
3.) For the selected species, use existing NMFS and state agency publications or raw data to determine historic magnitudes of historic recreational catch/harvest and commercial harvests. Also check on all species with reduced mortality to assure that no species of importance is overlooked.
4.) Determine whether existing studies exist on the recreational value of a fish for relevant species. I am aware of several studies of the recreational fishery in Oahu that may be useful. However, these values have to be considered in concert with other more specific studies for the situation presented to us. This will entail contacting researchers at universi-

ties, state and federal agencies. There are existing databases of sportfish values that can be accessed that may focus the search.

5.) Use available information on prices and commercial harvests to make an assessment of the potential for lost profits to commercial fishermen. In general, the USEPA procedure of using some percentage of lost revenue (0-40 %) will be followed.
6.) Determine the extent of losses to consumers of commercially harvested fish. This will entail use of an existing study or using available data to obtain a demand or inverse demand function.
7.) Using information obtain in 1.) - 6.) determine the likely range of losses associated with each species.

While non-use values are not expected to be proposed, however, if required by the NPDES permitting authority the process will involve:

1) Determine, in conjunction with state and federal officials, the likelihood that any change will result in increase numbers of ecological keystone, rare, or sensitive species, increase numbers of exotic or disruptive species, lessen disruption of ecological niches and ecological strategies used by aquatic species, increase local biodiversity, lessen disruption of predator-prey relationships, lessen disruption of age class structures of species or reduce public satisfaction with a healthy ecosystem.
2) If there is a strong likelihood that changes will create significant changes described in B. 1.), then a strategy to interject the economic consequences of the changes into the benefit-cost analysis must be pursued.
3) Although EPA did not present any acceptable application of a method to for non-use benefits valuation they do propose several approaches that will be considered in assessing the non-use values. The most likely approaches based on feasibility of costs are a benefit transfer approach and a break-even analysis. In addition, because alternatives to closed-cycle cooling must be considered, a cost-cost ap-

proach will be presented. This will show the costs per saved organism (or similar metric) for various technologies that may not be as costly as the closed-cycle cooling approach.

Our initial PIC benefits valuation method pricing is based on the assumption that use values only will be required.

Presuming that the cost/benefit approach is deemed appropriate, an onsite examination of the fishing area is proposed late in the implementation stage. By speaking with anglers and developing a decent knowledge of the local circumstances, we can adequately assess whether an existing study is relevant. Moreover, an examination will make contact with plant personnel who may know of gray literature that would be useful. They will also know whether our information is in concert with their general beliefs about the circumstances. If it is necessary to do sampling of fishermen, this visit will help determine the best study design.

The overall PIC will be prepared in a manner that fully conforms to the requirements in the Rule and consistent with the strategic compliance plan developed in Task 3. In developing the PIC, every effort will be made to maximize use of existing data, recognizing that biological sampling is the most costly component of the CDS. However, the plan will consider the establishment of a calculation baseline that provides a sound basis for comparison with data collected during Verification Monitoring. Should IM&E sampling be required, it will fully conform to the requirements identified in item 4 of the PIC.

The results of Task 2 (Preliminary Assessment of Technologies and/or Operational Measures) will satisfy item 1 of the PIC by identifying the proposed technologies and/or operational measures to be evaluated. The Team will rely on HECO to provide previous IM&E study reports and documentation of resource agency consultations. This information will be summarized and used to satisfy the requirements of items 2 and 3. The price of the technology and operational measures component of the PIC is based on the assumption that the initial PIC work will be an evaluation of the feasibility, effectiveness and costs of alternative fish protection technologies. Once HECO has determined that one or more technologies and/or operational measures are a cost-effective approach to compliance, more detailed work in the form of pilot studies can be

considered. Such studies will verify site-specific feasibility (i.e. biofouling, debris loads, etc.) and/or biological effectiveness (i.e., ability to meet the standards) of the options selected in Task 2. The Team may recommend site-specific pilot studies to address these issues.

Should HECO wish to include pilot studies in the PIC, estimated costs for preparing study plans will be provided to HECO as part of a future proposal. Such plans are considered to be beyond the scope of the currently proposed project because of the scope of pilot studies that may be required cannot be defined at this time. The PIC will be managed in an adaptive manner such that it can be modified at any point to accommodate pilot studies.

Based on the Strategic Compliance Plan and PIC, the nature of the monitoring plan (Para. 125.96 of the Rule) and record keeping and reports requirements (Para. 125.97 of the Rule) will be discussed. This discussion will focus on the key compliance options identified in the facility plan based on the compliance option selected for the facility.

The goal of Task 5 is to prepare and present the results of the study.

If included in the Strategic Compliance Plan, the PIC will discuss HECO's intention to use restoration measures, the nature of such restoration measures, and the general approach to evaluate these alternatives. Similarly, should a Cost-Benefit test be proposed, the methods for benefits valuation will be provided as required by the Rule.

Task 5– Reporting and Presentation of Results

Task 5 will communicate the results of this project by preparing the necessary reports and documents. Four documents will be prepared during the course of this project, as described in the Deliverables section of this report.

Task 6 (optional) – Support for Meeting with State and/or Federal Agencies

The goal of Task 6 is to support HECO in meeting with Federal and/or state agencies.

As an optional Task, the Team will support HECO in a meeting with NPDES permitting authorities and any other state or federal agencies that are appropriate to invite. This meeting will help educate the agency or agencies on consistency of the overall compliance plan with the final §316(b) Phase II Rule and will provide the basis for the PIC. This work would include preparation of a Microsoft PowerPoint® presentation and attendance at the meeting.

The presentation, at the direction of HECO, will include a summary of the §316(b) Phase II Rule, a summary of the compliance approach (based on the Strategic Compliance Plan developed in Task 3), and a summary of the PIC. The cost estimate for this task is based on a one-day meeting, time for preparation of the presentation, and a two-week notice prior to meeting with the State in order to ensure low cost airfares for travel to the meeting.

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Deliverables

There are four primary deliverables for this work:

1. **A "Preliminary Assessment of Fish Protection Technologies and Operational Measures" based on the results of Task 2.** The engineering assessment is limited to a 4-6 page letter report with a table listing the feasibility, effectiveness, and cost of the fish protection technologies and/or operational measures that could be used to meet the performance standards. The potential for each technology or operation measure to meet the appropriate performance standards will be evaluated. While this document would not meet the standard for use in the CDS, it is entirely adequate for the purpose of developing the strategic cost-effective compliance plan. It is also suitable to serve as the basis for identification of the technologies and/or operational measures to be evaluated in the PIC. Development of the complete technology and operational assessment report is deferred to a later date. The cost for completing a full engineering assessment is identified in the cost estimates to implement the PIC and prepare the CDS.
2. **A "Strategic §316(b) Compliance Plan" based on the results of Tasks 2 and 3.** This document will also contain estimates of costs for completion of the CDS and a preliminary estimate of potential compliance costs based on the Strategic Compliance Plan and PIC. This report will include information on the steps and costs to complete monitoring and reporting requirements.
3. **A PIC for submittal to the NPDES permitting authority.**
4. **A Microsoft PowerPoint® presentation as discussed in the optional Task 6.**

For each of the above, a draft report/document will be submitted to HECO personnel for review, and all comments received will be incorporated into the final report and presentation.

This work will provide HECO with the following important deliverables:

- An Assessment of Fish Protection Technologies and Operational Measures.
- A Strategic 316(b) Compliance Plan with budget forecasts for studies, reporting and compliance.
- A Proposal for Information Collection.
- An optional presentation to agencies.

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3 PROJECT TEAM

We are pleased to provide an experienced multi-discipline project team to meet the needs of HECO. We have assembled a team of experienced professionals possessing a wealth of combined expertise. Our Team will provide HECO with the highest quality services and deliver a successful project.

Our demonstrated ability to provide clients with excellent technical services and strong, responsive project management is unsurpassed.

Our clients are an invaluable part of our project, and we work closely with them. We keep them well informed of all progress and consistently incorporate their input into project development and implementation. We are committed to providing our clients with high quality professional services that will be the foundation of long-term relations.

The engineering evaluation of alternative fish protection technologies and/or operational measures will be performed by Alden. Alden is a national expert on fish protection technologies and provided technical consultation for UWAG and EPRI during the Phase I and Phase II rulemaking.

Alden is currently conducting or has recently completed detailed §316(b) alternative fish protection technology and operational assessments for Detroit Edison's Belle River facility, Mirant's Bowline and Canal Stations, four Southern Company plants (under contract to EPRI), and Ameren's Sioux, Newton, and Meramec facilities. In addition to these detailed evaluations, Alden is currently conducting or has recently completed numerous preliminary §316(b) technology reviews for several power companies with EPRI and EPRIsolutions, including Dominion Energy, NPPD, Exelon, Entergy, FirstEnergy, AES, Dairyland, LADWP, Reliant, and SCE&G. Additional fish protection intake evaluations are being conducted for Ontario Power Generation.

ASA will be responsible for evaluating baseline impingement mortality and entrainment, and determining the biological and economic benefits of existing and proposed intake technology, operational and restoration alternatives for each facility. As necessary, ASA will design biological monitoring programs (e.g., impingement mortality and entrainment characterization) that are specifically suited to each site and can conduct or supervise these monitoring programs or other biological sampling to obtain data required for a CDS.

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ASA staff have conducted §316(b)-related studies at more than 35 power plants throughout the country, and each senior ASA staff member has more than 25 years of continuous experience in such studies. These studies include three of the most complex §316(b) assessments conducted anywhere (Salem Generating Station, Diablo Canyon Power Plant, and Hudson River Utilities). Ongoing studies are being conducted for Dynegy, Mirant, Entergy, Consolidated Edison, KeySpan, New York Power Authority, Public Service Electric and Gas, and Pacific Gas and Electric, all of which include site-specific quantitative modeling of the biological benefits of intake alternatives.

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Team Roles and Responsibilities

Our Team is fully committed to our projects and we provide the essential elements to ensure their successful outcome. For all our projects, we commit the services of our most qualified engineering, scientific, and management professionals. We are confident in our ability to provide our clients with the expertise necessary to best serve their needs. This expertise is illustrated in the Team members selected for this project.

The specific skills, experience, and project roles of each of our key Team members are summarized below. Full resumes of these experts are included in Appendix C.

Dave Bailey, EPRIsolutions – Project Manager

Dave Bailey will serve as the Project Manager for this engagement. In this capacity, he will be responsible for all day-to-day project management tasks and communication with both Alden and HECO. He will also direct the team resources, monitor project schedules, and review project deliverables. Mr. Bailey will play a key role in the development and quality assurance of project deliverables and play the lead role in developing the strategic compliance plan for each facility.

Mr. Bailey is uniquely qualified having over 25 years of §316(a) and §316 (b) experience. Mr. Bailey played a leadership role on behalf of industry for the last five years during EPA's §316(b) Rulemaking. Serving as Chairman of UWAG's Cooling Systems Committee, Mr. Bailey represented industry during the §316(b) regulatory development process, including testifying at EPA stakeholder meetings, negotiating with the Agency, serving on the EPA Technologies Workshop Panel, and developing and reviewing comments on proposed rules. Mr. Bailey has also served in a leadership capacity for EPSA and EPRI's §316(b) program.

Mr. Bailey has managed or provided technical support on §316 issues in marine, estuarine, and freshwater environments. He played a leadership role in developing one of the first barrier net systems successfully deployed in an estuarine environment and demonstrated its capability to meet EPA's impingement performance standard. Mr. Bailey also negotiated one of the early restoration

OUR PROJECT MANAGER'S RELEVANT EXPERTISE

- 25 years experience in Clean Water Act issues including 316(a) and 316 (b).
- Chair of Utility Water Act Group's Cooling Systems Committee.
- Represented Industry during 316(b) rulemaking.
- Developed one of the first successful barrier net systems.
- Testified at EPA stakeholder meetings.
- Technical support for issues in marine, estuarine, and freshwater environments.
- Published many peer-reviewed 316 articles.

projects as an alternative to BTA to satisfy §316(b) requirements and more recently has successfully negotiated a memorandum of understanding to credit production of a company-owned aquaculture facility toward compliance with §316(b) Phase II final regulations. He has published numerous articles on §316(b) in peer-reviewed literature.

Thomas Cook, Alden - Engineer

Mr. Cook will manage the project activities for Alden. Mr. Cook will be assisted by Mr. Nathaniel Olken (Civil Engineer) and Mr. Jonathan Black (Biologist).

As Director of Environmental Engineering, Mr. Cook is responsible for conceptual and detailed design engineering efforts related to fish protection and passage at hydroelectric, thermal power, and water resource projects. He specializes in economic analyses of alternative fish protection and passage facilities, and provides the hydraulic, hydrologic, and structural expertise necessary for their installation. This effort includes preparation of bid drawings and specifications. Other current activities include development of deterrent/behavioral devices (including field testing), relicensing studies, feasibility studies, and technical input for evaluating fish protection and passage systems including behavioral devices (sound, infrasound, strobe lights), fish screens, ladders, and lifts. For the Department of Energy, he was responsible for the construction and testing of the pilot scale fish-friendly turbine test facility.

Jonathan L. Black, Alden – Biologist

Mr. Black will assist Mr. Cook in all biological tasks. Mr. Black received his B.S. in biology from University of Massachusetts, Amherst and is currently completing his Masters degree in Wildlife and Fisheries Conservation. At Alden, Mr. Black is involved in a variety of biological issues related to fish protection at cooling water intakes and downstream and upstream fish passage at hydroelectric projects. In addition to evaluating fish protection technologies in the laboratory and the field, Mr. Black is responsible for the biological aspects of Alden's §316(b) reporting efforts. He was deeply involved in developing comments on EPA's proposed Rule for UWAG and EPRI.

OUR LEAD ENGINEER'S RELEVANT EXPERTISE

- Developed deterrent/behavioral devises
- Specializing in economic analysis of fish protection technologies.
- Multiple publications

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Nathaniel Olken, Alden – Civil Engineer

Mr. Olken will assist Mr. Cook in all engineering tasks. Mr. Olken received his B.S. in Civil Engineering from University of Massachusetts, Amherst. Nate is responsible for analyzing the current structural components of cooling water intakes and determining which technologies will meet the proposed regulations and the costs associated with their application. Mr. Olken contributed technical comments to UWAG and EPRI during the recent EPA rulemaking. His ability to comprehend both technical engineering and biological reports makes him an important member of Alden's §316(b) team.

William Dey, ASA

Mr. William Dey will serve as the manager of all biological study components for ASA, and will be supported by Drs. James McLaren and John Young. Mr. Dey, in particular, will be responsible for the performance of cost-benefit evaluations. Mr. Dey has more than 30 years of experience in the design and analysis of biological monitoring programs to estimate losses resulting from impingement and entrainment at cooling water intake structures. He has personally directed impingement and entrainment monitoring studies and assessments at more than 15 power plants throughout the United States and is currently principal investigator for the development of national guidelines for design of entrainment and impingement monitoring studies, being sponsored by the Electric Power Research Institute.

James McLaren, Senior Scientist (ASA)

Dr. McLaren, along with Dr. Young, will provide support to Mr. Dey, including preparation of impingement and entrainment characterization sampling plans, data analysis, and reporting activities for the impingement and entrainment characterization study. Dr. McLaren has more than 30 years of experience in designing and conducting environmental monitoring studies, including numerous CWA §316(a) and (b) studies for which he has served as technical director, project manager or senior advisor. His extensive experience in Natural Resource Damage Assessments will be used in support of restoration alterative evaluations.

RELEVANT EXPERTISE OF SUPPORTING TEAM

- Biological
- Civil engineering
- Financial analysis

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John R. Young, Senior Scientist/Associate (ASA)

Dr. Young has over 25 years of experience in §316(b) and other environmental issues, both as a consultant and an employee of the electric utility industry. He has been instrumental in the continuing Hudson River §316(b) monitoring programs since the 1970's and is intimately familiar with current issues and practices of §316(b) permitting. Through participation in UWAG and EPRI efforts, he has helped coordinate the industry response to environmental regulations involving §316(b), pesticides, electromagnetic fields, dredging, transmission corridor management, wetlands and wildlife. Dr. Young also provides technical direction for ASA's applied statistics and empirical modeling services.

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Other Key Team Members Available As Needed:

Douglas Dixon, Ph.D., EPRI - Manager, Water Quality and Fisheries Research

Dr. Dixon has over 25 years of professional experience in aquatic ecology, fisheries science, and environmental impact assessment for public and private sector clients. His current professional focus is in fisheries research and the assessment of environmental impacts on aquatic resources from operation of thermal and hydroelectric power plants. Research interests include the early life history (e.g., age, growth, mortality, and recruitment) of migratory fish.

As Manager of the Hydropower Environmental Issues Research Program (instream flows, fish passage and protection, dam removal, ecosystem restoration, and water resource management research), Dr. Dixon provides management and technical support to the Clean Water Act Section 316 (a & b) Fish Protection Issues Research Program (aquatic ecosystem evaluation, ecological risk analysis, fish protection technologies).

Edward P. Taft, Alden – President

Mr. Taft is President of Alden and currently oversees Alden's 316(b) team. He received his B.S. in Biology from Brown University and his M.S. in Biology from Northeastern University. In addition to his role as President, Ned is responsible for Alden's environmental services. He has over 30 years experience in developing and testing fish protection technologies for both cooling water and hydroelectric project intakes. This experience currently places him in a unique position to oversee all aspects of 316(b)-related issues.

Stephen V. Amaral, Alden – Director, Fisheries

Mr. Amaral has extensive experience in the assessment and resolution of fish passage and protection issues at all types of water intakes. This experience has been developed over the past 14 years through the management of laboratory and field evaluations of developing and existing fish passage technologies. Mr. Amaral also performs evaluations of aquatic resource impacts for Federal Energy Regulatory Commission (FERC) Environmental Impact Statements and for meeting Clean Water Act (CWA) Section

Additional experts are available as needed.

316(b) requirements. Mr. Amaral is the author of several comprehensive reports describing the status of fish passage technologies and he was the lead in the development of a guideline document for turbine entrainment and survival studies. Recent projects that Mr. Amaral has been involved with include overseeing the biological evaluation of a Fish-Friendly Turbine, the development of an entrainment and impingement database for cooling water intakes, estimation of turbine and spillway survival at small hydro plants, a laboratory assessment of wedge-wire screen entrainment and impingement, and an evaluation of estuarine fish responses to behavioral technologies.

Steven M. Jinks, ASA – President

Dr. Jinks is a senior scientist with 30 years of experience supervising and conducting environmental research, field investigations, literature reviews, regulatory analysis, preparation of environmental impact statements and reports, litigation support and expert testimony, and other client services. He spent 21 years as a scientist, project manager, and vice president at EA Engineering, Science and Technology, Inc. where he was involved in dozens of projects involving ecological and human health risk assessment, development of biological monitoring equipment and protocols, and environmental management and restoration. Since establishing ASA Analysis & Communication in 1997, he has consulted extensively on the impacts industrial and municipal high-volume water intakes, including §316(b) demonstrations and alternative technology evaluations.

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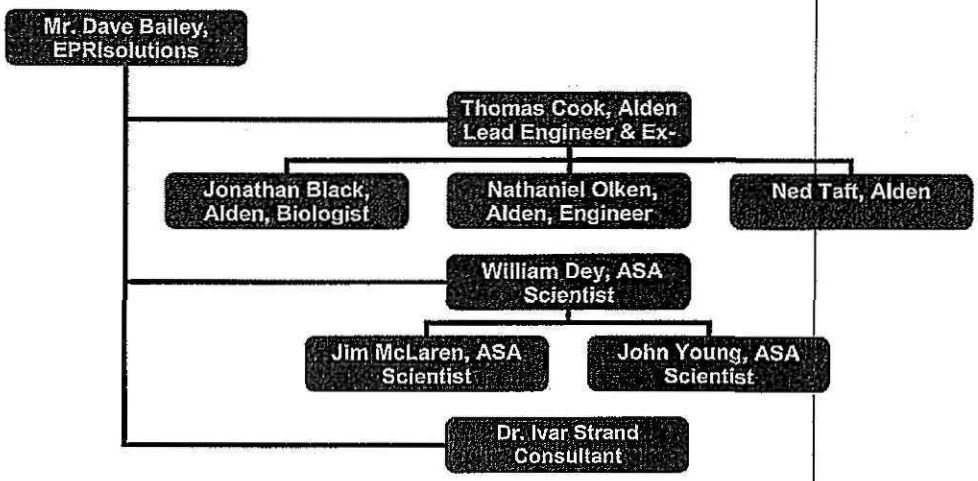
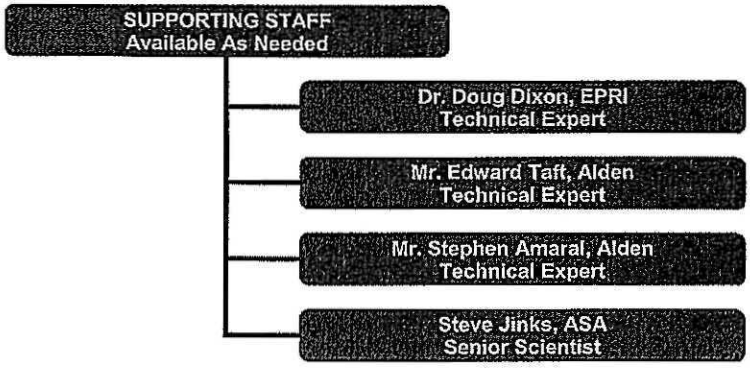
Organization of Expert Team





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4 PRICE & SCHEDULE

Schedule

The schedule for completing the work will be metered by achieving certain milestones and assumes contract signature by July 30, 2004. Delays in contract execution will delay the schedule accordingly. The schedule also assumes a 2 week turnaround with comments to draft documents. Delays in commenting on draft documents will also result in delays to the schedule.

Milestone	*Completion Date*
Contract Execution	7/30/04
Set date for project kickoff conference call	8/6/04
Hold project kickoff conference call	8/20/04
HECO Provide Information detailed in Task 1	9/20/04
Site visits	10/1/04
Draft Technology Report and Strategic Plan	11/5/04
Comments received on draft strategic plan and technology report	11/19/04
Final Technology Report submitted (Deliverable 1)	12/3/04
Final Strategic Plan submitted (Deliverable 2)	12/17/04
Draft PIC delivered	1/10/05
Comments received on draft PIC	1/24/05
Final PIC delivered (Deliverable 3)	2/7/05
Support for Agency Meetings (Deliverable 4)	To be determined

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Price

The proposal is budgeted on the assumption that all 3 Phase II facilities can be visited over a 2 day period with about one-half day needed for each site.

The fixed price for the work offered in this proposal is $154,000. The additional price for the optional trip and meeting with regulatory agencies is $12,500.

The Price for the Proposed Services is $154,000.

Payment Schedule

Billing for this project will be on a milestone basis with the following schedule:

Project Initiation:	$25,000
Draft Technology Report & Strategic Plan:	$50,000
Draft PIC Submitted:	$50,000
Final PIC Submitted:	$29,000
Optional Trip:	$12,500

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5 TERMS AND CONDITIONS

The terms in this proposal are valid for a period of 60 days from date of submission.

EPRIsolutions standard billable services terms and conditions apply.

This proposal contains proprietary information and data that shall not be duplicated, used or disclosed – in whole or in part – for any purpose other than to evaluate this proposal. If, however, a contract is awarded to this offer as a result of, or in connection with, the submission of this proposal, the client shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting contract. This restriction does not limit the client's right to use information contained herein if it is available from another source that does not have restrictions with EPRIsolutions regarding use or disclosure.

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6 SUPPLEMENTAL INFORMATION

Complete Checklist of Information Needed For Task 1

1) Information Provided to EPA to Support Their Phase II Rule Development
- ☐ Assigned plant code for 308 Questionnaire
- ☐ Completed (long or short-form) EPA 308 Questionnaire

2) Circulating Water System
- ☐ Project general arrangement/overall site drawings
- ☐ Piping layout and profile
- ☐ Hydraulic grade line estimates
- ☐ Discharge structure drawings

3) Cooling Water Intake Structure (CWIS)
- ☐ Plans and sections showing intake bays, bar racks, traveling screens, and pumps
- ☐ Details of any existing fish protection features, including fish return troughs/pipes
- ☐ Debris troughs configuration
- ☐ CWIS design flows
- ☐ CWIS actual flows
- ☐ Water surface elevations
- ☐ Screen mesh size and geometry
- ☐ Screen spraywash volumes (high pressure and low pressure)
- ☐ Screen rotational speeds
- ☐ Bathymetric data in vicinity of the CWIS
- ☐ Icing conditions (problem, inspection, and/or maintenance reports)
- ☐ Sedimentation/dredging issues (problem, inspection, and/or maintenance reports)
- ☐ Available velocity data (magnitude and direction) upstream of, and in, the CWIS
- ☐ Debris history (type, time, frequency for screen, and trash rack cleaning)
- ☐ Any other operational problems

4) Circulating Water Pumps
- ☐ Performance curve
- ☐ Recent performance data or test results
- ☐ Design data, specification, configuration drawings
- ☐ Pumphouse plans and sections

5) Condenser Data
- ☐ Design drawings (general arrangement, steam dome)
- ☐ Recent performance data
- ☐ Any significant as-built modifications (such as Taprogge debris filter)
- ☐ Inlet water temperatures throughout year

6) Facility Operations

- ☐ Facility output (MW)
- ☐ Operating mode (peaking, base load) with information on schedule
- ☐ Facility capacity factor
- ☐ Five years (minimum) of operational data (MW, MWh, and intake flow) that is considered to be representative of the expected plant operation reflecting seasonal variations.
- ☐ Evaluated cost of a MW (capacity and energy) with seasonal variations
- ☐ Estimated remaining facility life

7) Biological Data

- ☐ Existing impingement and entrainment monitoring data (for example, historical 316(b) demonstration studies)
- ☐ Description of biological resources in the vicinity of the CWIS
- ☐ Species to be protected (include threatened or endangered, if appropriate)
- ☐ Life stage occurrence and abundance
- ☐ Diurnal and seasonal differences is species composition or abundance

8) Restoration Data

- ☐ Existing off-site mitigation projects that directly address intake impacts (such as wetland restoration, fish hatchery, artificial reef construction, and other habitat restoration related projects)
- ☐ Major ecological assets (wetlands, shoreline habitat) that could be used/donated to offset CWIS impacts
- ☐ Facility or corporate stewardship programs that can be further developed to meet restoration requirements in EPA's Rule
- ☐ Restoration activities of interest to state and federal resource agencies and tribes in your operating area (for example, is your state agency engaged [or interested] in restoration activities such as wetland restoration or other habitat restoration).

We recognize that, in many cases, not all of the above information will be available. However, as much of the information as possible should be provided. Any critical missing information will be discussed prior to or during the site visit (Task 1).

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Our Comprehensive Methodology

1. Site Visit – The process begins with a site visit to view the existing cooling water intake structure (CWIS) and meet with appropriate client staff. The goal of this visit is to fully understand the CWIS design, operation, and location on the waterbody. The visit is also used to address questions on information required prior to the site visit and to discuss some alternative compliance strategies that will be evaluated.

2. Engineering Assessment of Fish Protection Technologies and Operational Measures – Based on the site visit and discussions with appropriate company/facility our team will begin by evaluating whether each facility can meet the performance standard based on the existing CWIS design, location, construction and operation compared to the Rule's "calculation baseline" set by EPA in the final rule. For example, if a facility has an offshore intake it may be found to be in compliance based on lower offshore fish densities or be able to take substantial credit toward meeting the performance standard. This assessment will involve input from both Alden's engineers and ASA's biological experts. Such assessments are conducted for each facility. If a facility cannot comply based on existing technologies and operational measures Alden will conduct an evaluation of alternative fish protection technologies and operational measures to meet applicable performance standards using its extensive experience and databases.

3. Development of Cost-Effective Compliance Plan – Based on the results of the Engineering Assessment and the site visit, recommendations are developed for cost effective compliance. The strategic assessment considers the results of the technology assessment, as well as potential credit for any restoration measures. The plan will evaluate all five compliance alternatives, including the use of new restoration measures and the use of site-specific standards. The Team will determine the applicability of satisfying the cost-cost or cost benefit test to obtain a site-specific BTA determination. This analysis will also consider cost- effective methods for obtaining the necessary information to support the compliance plan. In addition to the collection of data through new studies, The Team will consider use of existing information, source water body information, and information from other facilities. Our team recognizes that the need for data and/or information in a cost-effective compliance plan is substantially determined by the overall compliance strategy and the alternative fish protection technologies and/or operational measures that may be selected. The existing information may be deemed adequate for use in the CDS, depending on factors that include:
    a. the quality of the information and the extent to which it can be demonstrated to represent current waterbody conditions
    b. the extent to which the facility can receive credit toward meeting the performance standards based on the baseline calculation
    c. the compliance option selected.

   Once the client has approved the compliance plan work can begin on Step 4.

4. Preparation of "Proposal for Information Collection" (PIC) – The PIC is the first element of the Comprehensive Demonstration Study and is required for submittal by all facilities except those facilities that have or will have closed cycle cooling, or have or will have maximum design through screen velocities less than 0.5 ft/sec for sites where only the impingement mortality standard is required, (Compliance Option 1 of the Rule). Those facilities that have or will install EPA "approved technologies" (Compliance Option 4 of the Rule) will be required to submit minimal PIC biological study requirements. The

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PIC will be developed based on the facility compliance plan developed in Step 3. The PIC will include all of the information required including technologies to be evaluated, use of restoration, use of site specific standards, nature of biological information to be used (including detailed study designs for any necessary studies), and a summary of existing biological information.

5. Discussion of Monitoring Plan and Record Keeping and Reporting – Based on client needs the nature of the monitoring plan (Para. 125.96 of the Rule) and record keeping and reports requirements (Para. 125.97 of the Rule) can also be included as part of the strategic assessment. This discussion will focus on the key compliance options identified in the facility plan, since the nature of monitoring plans and record keeping can vary considerably based on the compliance option selected for the facility.

6. Preparation of Cost Estimates to Implement the Compliance Plan and PIC – Based on the strategic compliance plan and PIC, cost estimates will be prepared to assist clients in developing budgets for 316(b) compliance. This cost estimates will include:
    - costs for implementing and operating the technology and/or operational measures that could meet the performance standards
    - costs for biological monitoring (both current levels of impingement mortality and entrainment and verification
    - costs for conducting the benefits valuation using the cost-benefit test.
    - "Costs preparing the Comprehensive Demonstration Study" report based on the strategic compliance plan.

    These costs will allow utilities to develop a budget for implementing the compliance plan in 2005 and preliminary budgets for the rest of the compliance process. The budgets for development of the impingement and entrainment baseline calculations, which are anticipated to be conducted in 2006 and 2007, should be considered preliminary since PIC studies are defined as "adaptive" in the Rule. Based on 2005 study results, utilities may want to modify either the PIC or compliance plan based on further evaluation of alternative fish protection technologies and/or operational measures and/or the analysis of historical biological data and the results of 2005 biological studies. Such revisions, if necessary, could result in changes to 2006 and 2007 budget estimates. Budget estimates will be presented in the strategic compliance plan document.

7. Regulatory Support – Clients may want to take advantage of our Teams reputation and experience in meeting with appropriate State and/or Federal NPDES permitting authorities. Such assistance may include educating regulators on 316(b) requirements and providing support for the utility's overall compliance plan based on Step 3 or the PIC based on Step 4.

The number of steps listed above can be modified to meet a client's budget needs.

Hawaiian Electric Company, Inc.

Proposal to Conduct §316(b) Phase II Impingement and Entrainment Sampling at Honolulu, Kahe, and Waiau Generating Stations in Hawaii

Part II. Cost Proposal

December 27, 2005

Submitted to:

Mr. Kirk Tomita
Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, Hawaii 96840

Prepared by:

TENERA Environmental
141 Suburban Rd., Suite A2,
San Luis Obispo, CA 93401
805.541.0310, FAX: 805.541.0421

and

***AECOS* Inc.**
45-939 Kamehameha Hwy., Room 104
Kaneohe, Hawaii 96744

1.0 Introduction

This Cost Proposal presents the costs associated with completing the scope of work described in our separate Technical Proposal. Tenera Environmental Inc. (Tenera) in cooperation with *AECOS*, Inc. prepared these technical and cost proposals based on Tenera's experiences conducting similar entrainment and impingement studies at major coastal generating stations in California from San Francisco Bay to San Diego and *AECOS* experience working with the HECO Environmental Department on conducting the original 316(b) studies at these facilities in the 1970s. The scope of work described in the technical proposal was developed from impingement and entrainment sampling plans prepared by ASA Analysis and Communications, Inc. The plans were submitted as part of the Proposal for Information Collection (PIC) submitted for each facility to the Hawaiian Department of Health (DOH) in compliance with new 316(b) Phase II regulations.

We identified the following four tasks associated with the project that are described in detail in our technical proposal:

1) Site visits to all three facilities to coordinate sampling with HECO personnel and develop details of the impingement and entrainment sampling procedures specific to each facility,

2) Quantifying the types, abundances and biomass of fishes impinged on the cooling water screening mechanisms at each generating station,

3) Quantifying the types and abundances of fish eggs and larvae entrained through each generating station, and

4) Collecting sand samples at the Kahe Generating Station.

The costs associated with the scope of work tasks described in detail in the Technical Proposal and presented in Section 2 include options for changes to the sampling frequency and methods described for entrainment in the PIC IM&E sampling plans. These options are presented based on our experiences in conducting 316(b) IM&E studies over the past ten years at seven major coastal generating stations in California, which is in EPA Region 9, as is Hawaii. These recommended changes will result in significant cost savings for the project. The total costs and costs at each facility are presented in Section 3. Rate schedules for Tenera Environmental, Inc. and *AECOS*, Inc. are included with this proposal.

2.0 Scope of Work

All costs presented in this section and in Section 3 are based on the rate schedules for Tenera Environmental, Inc. and *AECOS*, Inc. included as attachments to this cost proposal.

2.1 Task 1 - Pre-Sampling Site Visit

Tenera and *AECOS* will conduct site visits to all three facilities to coordinate the sampling with plant personnel and obtain details on the cooling water intake systems necessary for finalizing the sampling programs and SOPs, complete SOPs for impingement and entrainment sampling, conduct initial training of sampling staff, and coordinate initial sampling efforts with HECO staff. The total estimated cost for this task is $17,028, which would be split evenly among the three facilities.

2.2 Task 2 - Impingement Sampling

Impingement sampling will be conducted fours times a day once a week at each of the three HECO facilitates for a period of one year starting in February 2006. The total costs include all sampling, QA/QC activities, data management, and submittal of monthly progress reports to HECO. The total estimated cost for this task is $235,697, which would be split evenly among the three facilities. Although the total budget presented in Section 3 divides the total costs for impingement equally among the three facilities, the level of impingement sampling will be less at the Honolulu Generating Station due to the smaller number of traveling screen assemblies. If requested Tenera and AECOS will track the hours separately for each facility to provide a more accurate breakdown of labor costs.

2.3 Task 3 - Entrainment Sampling

The RFP proposes that entrainment sampling be conducted fours times a day once a week at each of the three HECO facilities for a period of one year starting in February 2006. The requested sampling method uses a pump to collect samples in the discharge areas at each of the three facilities. Tenera and *AECOS* believe that a biweekly sampling frequency could be easily justified based on sampling done at power generating facilities on the California coast. We also believe that samples could be more easily collected using plankton nets in the intake areas at each of the facilities. The total costs for the four options for entrainment sample collection and processing at all three facilities presented in the Technical Proposal are as follows:

Option 1 – Weekly pump sampling as described in the RFP - $644,371

Option 2 – Biweekly pump sampling - $336,105

Option 3 – Weekly net sampling in intake areas - $571,801

Option 4 – Biweekly net sampling in intake areas - $294,145

The total costs for all four options include all sampling equipment, field sample collection, laboratory sample processing, field and laboratory QA/QC activities, data management, and submittal of monthly progress reports to HECO. The total costs for each option would be divided equally among the three facilities. The estimated costs do not include assisting HECO with justifying the proposed sampling options to the State of Hawaii Department of Health (DOH).

2.4 Task 4 - Kahe Generating Station Sand Sampling

Sand sample collection and data recording will be completed at no cost since personnel will be present at the Kahe Generating Station on a regular basis. This assumes that the sampling can be completed during the normal impingement and entrainment sampling schedule.

3.0 Total Project Budget

The total project budget presented in Table 1 shows the costs for each task including the four entrainment sampling options. The total costs are evenly divided among the three facilities. The budget does not include any costs associated with justifying proposed optional entrainment sampling to DOH or any reporting and analysis beyond the monthly sampling progress reports. All costs in the budget are based on the attached rate schedules for Tenera Environmental and *AECOS*, Inc.

Table 1. Total budget for impingement and entrainment sampling at three HECO generating stations on the island of Oahu: Honolulu, Kahe and Waiau Generating Stations.

Task	Labor ($)	Travel ($)	Supplies & Materials ($)	Other Services ($)	Total ($)	Total ($) by Generating Station: Honolulu Generating Station	Kahe Generating Station	Waiau Generating Station
1) Project Mobilization and Training	12,243	4,400	330	55	**17,028**	5,676	5,676	5,676
2) Impingement Sample Collection and Processing	230,914	2,063	2,391	330	**235,697**	78,566	78,566	78,566
3a) Entrainment Sample Collection								
Option 1 - Weekly Pump Sampling	209,082	2,063	34,800	9,504	**255,448**	85,149	85,149	85,149
Option 2 - Biweekly Pump Sampling	104,559	2,063	29,995	5,027	**141,643**	47,214	47,214	47,214
Option 3 - Weekly Net Sampling	159,124	2,063	12,188	9,504	**182,878**	60,959	60,959	60,959
Option 4 - Biweekly Net Sampling	85,040	2,063	7,555	5,027	**99,684**	33,228	33,228	33,228
3b) Entrainment Sample Processing								
Option 1 and 3 - Weekly Sampling	386,024	0	2,899	0	**388,923**	129,641	129,641	129,641
Option 2 and 4 - Biweekly Sampling	193,012	0	1,449	0	**194,461**	64,820	64,820	64,820
Totals (Mobilization, Training, Impingement, and Chosen Entrainment Option)								
Option 1 - Weekly Pump Sampling	838,262	8,525	40,420	9,889	**897,096**	299,032	299,032	299,032
Option 2 - Biweekly Pump Sampling	540,727	8,525	34,165	5,412	**588,830**	196,277	196,277	196,277
Option 3 - Weekly Net Sampling	788,304	8,525	17,808	9,889	**824,526**	274,842	274,842	274,842
Option 4 - Biweekly Net Sampling	521,208	8,525	11,725	5,412	**546,871**	182,290	182,290	182,290

Tenera Environmental Inc. Rate Schedule

	2006		2007	
Job Category	Normal Hourly Rate	Diving Rate	Normal Hourly Rate	Diving Rate
Director	165.00		170.00	
Principal Investigator	110.00	159.50	115.00	166.75
Project Manager	100.00	145.00	105.00	152.25
Senior Scientist	85.00	123.25	90.00	130.50
Scientist	70.00	101.50	73.00	105.85
Senior Data Analyst	70.00	101.50	73.00	105.85
Senior Research Assistant	53.00	76.85	55.00	79.75
Research Assistant II	42.00	60.90	44.00	63.80
Research Assistant I	32.00	46.40	34.00	49.30
Technical Editor	80.00		80.00	

Other project-related direct costs and travel will be billed at cost plus 10% to cover associated General and Administrative expenses. Use of personal vehicles for travel will be billed at the mileage rate of $0.45 per mile.

AECOS Inc. Rate Schedule

Labor Category	Hourly Rate ($)
Project Management	*102 + tax*
Senior Biologist	70 + tax
Biologist	48 - 58 + tax

Tomita, Kirk

From: Bailey, David [DBAILEY@epri.com]

Sent: Thursday, February 15, 2007 12:51 AM

To: Bailey, David; KWhelan@reliant.com; Susan.Damron@WATER.LADWP.com; Steve.Bauman@mirant.com; BKC3@pge.com; Rafael.Garrett@ladwp.com; heckler@songs.sce.com; ronald.kino@mirant.com; steven.maghy@aes.com; patrick.tennant@sce.com; RLawhn@reliant.com; Katherine.Rubin@WATER.LADWP.com; jwhite@lspower.com; Hemig, Tim; Dixon, Doug; Taylor, Tina; Tomita, Kirk; Cunningham, Bryan K

Cc: jsteinbeck@tenera.com; dmayer@tenera.com; sbeck@mbcnet.net; Taylor, Tina; Dixon, Doug; John Maulbetsch; Shirley_Pearson@URSCorp.com

Subject: RE: Project Updates and Proposed Workshop

Attachments: Workshop and Project Status 12-14-07.doc; ReportOutline 2-14-07 (3).doc; Facility Information Needed for Closed-Cycle Cooling Project (3) 2-14-07).doc

Please see attachments.

Thanks,

Dave

David E. Bailey
Senior Project Manager
EPRI
8819 Trafalgar Ct.
Springfield, VA 22151
Office Ph. 703-978-6226
Cell Ph. 571-643-2320

All:

The purpose of this email is to propose a Workshop/Meeting and provide an update on the status of the two current projects.

316(b) Workshop – I am proposing a workshop/meeting to discuss our two projects and suggest other projects they may be of interest in light of the Second Circuit Court Decision (Decision). The workshop assumes that EPA will go through a rulemaking process to make revisions to the portions of the Rule remanded to EPA by the Court. Topics to be discussed at the Workshop would include:

- Use of Closed-Cycle Cooling Report - The Decision and an EPA Rulemaking warrant some consideration of modifying the goal/use of the closed-cycle cooling project report. The Court remanded to EPA the determination of BTA and whether it should include use of wet or dry closed-cycle cooling. There is a significant risk that EPA could determine that closed-cycle cooling is BTA nationally or on certain waterbody types. This project could be modified to use the document for submittal to EPA in support of a determination that retrofit costs cannot be reasonably be borne by the industry (ex. due to retirement rather than retrofit for less economical units, adverse environmental impacts, energy supply issues, etc.). As we have discussed a retrofit requirement would have significant economic and energy supply implications for California.
- Use of OTC Impacts to California Coastal Fisheries Report – The Decision made it clear that benefits could not be considered in EPA's BTA determination. However, the Decision litigation issues did not include EPA's determination that certain facilities (i.e. those on reservoirs, freshwater lakes other than the Great Lakes, freshwater rivers that used less than 5% of mean annual flow and those on any waterbody type with capacity utilization less than 15%) were exempt from entrainment due to low potential for Adverse Environmental Impact (AEI). The Decision deferred to EPA making the AEI determination. This report could serve two purposes in terms of an EPA Rulemaking.
    1. EPA in the Rule based its determination of the National Benefits of the Rule on a relatively small number of high profile facilities using old studies. New current studies are now available in California. Generally the current studies are showing that for most facilities, much smaller IM&E losses are reported than in the historical studies. Submitting this information into the Rule could help support a relatively small benefit (EPA is still required to discuss the costs and benefits of any Federal rule to comply with Executive

Order) would be achieved compared to the cost. This would aid in contrasting the benefits with the very high cost of a national retrofit.

2. While it is unlikely that EPA would revert to an AEI based Rule, the updated IM&E information could inform EPA on expanding use of low potential for AEI based on newer data and low levels of entrainment. This could be very compelling, especially for peaking facilities. The Report could be modified to include the current data in the report.

- Available Technologies – A concern for California facilities is that alternatives to closed-cycle cooling are limited and California stakeholders or State Agencies my comment that there are no alternatives. This could leave EPA in a position with no alternative but to designate retrofits as BTA for California's facilities. A project could be initiated to document potentially available alternatives. This analysis is also important to facilities individually in the absence of restoration or the Cost-Benefit Test.
- Technology Pilot Studies – As discussed at the last workshop, uncertainties exist regarding alternative technologies such as narrow slot wedgewire and fine mesh traveling screens in terms of feasibility, performance and cost. Several Companies have expressed interest in proceeding with studies to address these uncertainties. The Workshop would include a discussion of specific proposals to address the uncertainties.
- Other topics that Companies may want to discuss. Please provide me with your suggestions.

I propose holding the Workshop at EPRI's offices in Palo Alto. My preferred date for the workshop would be either March 12th or 13th but the Workshop could be held any day the week of March 12th or March 19th. Please let me know via email if you would like to participate and your availability during this two week period.

Closed-Cycle Cooling Retrofit Project Status Report – John Maulbetsch provided me with an update on the status this project this week. John reported that he planned to have a draft done for review by the end of March. However he had the following comments:

- There are still 5 facilities California facilities that have not sent any or very little information. All five have been notified and for a couple the Company indicated the studies may not be included.
- The outline John is planning for the report is attached.
- Section 8 of the report is where the individual facilities will be discussed in terms of the level of difficulty or problems associated with a retrofit. There are a number of specific issues that we would like to include in the report for individual facilities, but information is currently lacking. I have attached a list of these issues in the email. In terms of cost/degree of difficulty, the diagrams and layouts for specific facilities generally do not shown what is under the ground at the sites that may be problematic for retrofit piping. This could be addressed as part of the more detailed site

specific analysis you might plan to conduct later, but to the extent you want it discussed in this report that information needs to be provided. Similar items still needed, to the extent you want to include them for your facilities, are listed in the attachment.

OTC Impacts to California Coastal Fisheries – A draft of all sections of this report has been completed with the exception of the discussion which is 70% complete. Tenera completed the largest Section of the report on specific impacts to California species. I have reviewed that provided comments and expect to receive revisions early next week. At that point a draft of the entire document will be ready for a final review by Tenera, Larry Barnthouse and Doug Dixon. I expect to have a draft to you by the end of February.

EPRI | ELECTRIC POWER RESEARCH INSTITUTE

NON-EMPLOYEE TRAVEL EXPENSE FORM

Name	Mailing Address
Kirk S. Tomita	HECO Environmental (HPO-JW) PO Box 2750 Honolulu, HI 96840-0001
Title Sr. Environmental Scientist	

Business Trip and Purpose (including Position applied for)

Attend the Pacific Coastal Facilities 316(b) Workshop in Palo Alto, CA on March 22, 2007.

EXPENSE DESCRIPTION	EXPENSES ITEMIZED BY DATE							TOTAL
	Date 3/20/07	Date 3/21/07	Date 3/22/07	Date 3/23/07	Date	Date	Date	
Mileage @ $0.445/mi.								$ -
Air or Rail Fare	605.00							$ 605.00
Car Rental/Taxi/Bus Fare		39.63	39.64	39.64				$ 118.91
Parking								$ -
Phone								$ -
Lodging		98.99	98.99					$ 197.98
Breakfast		13.67						$ 13.67
Lunch		7.50		8.31				$ 15.81
Dinner				11.12				$ 11.12
Other misc. items (please explain below)				39.17				$ 39.17
Total								$ 1,001.66

Explanations:

Other misc. items: Gas ($39.17)
Due to airline flight availability to and from Hawaii, attendee was required to arrive the day before and leave the day after the work shop.
Original receipts were required to be submitted with Attendee's HECO expense report (copy of receipts attached).

Acct:	Dept:	Project:

Signature | 6/18/07 Date | [redacted] Social Security Number | EPRI Approval | Date

*** Please attach all original expense receipts over $25**

TENERA Environmental

April 4, 2007

Mr. Kirk Tomita
Hawaiian Electric Company
170 Ala Moana Blvd.
Honolulu, HI 96813

Subject: Cost estimates for completing sample processing of 2006-2007 entrainment samples and continued impingement and entrainment sampling for 2007 and 2008 at the Hawaiian Electric Honolulu, Kahe, and Waiau Generating Stations

Dear Mr. Tomita,

As we discussed during our meeting in Palo Alto, I am submitting the cost estimates for completing sample processing of 2006-2007 entrainment samples and continued impingement and entrainment sampling for 2007 and 2008 at the Hawaiian Electric Honolulu, Kahe, and Waiau Generating Stations.

We recently submitted the invoice for the work completed during February 2007 that increased the total expenditures on the project to $573,654. The March invoice will total approximately $60,000 which includes Tenera's continuing sample processing and the final billing for AECOS. This results in a remaining balance on the contract of approximately $260,000. We anticipate that the cost for the remaining processing will total approximately $130,000 leaving a balance of approximately $130,000. All of these cost estimates are subject to change, but I am certain that the project will be completed under the contract total largely due to the reduced entrainment sampling effort starting in August.

As we discussed, the cost to conduct an additional year of sampling depend on sampling frequency for impingement. I have received estimates from AECOS for the continued sampling effort. They provided costs for the combined impingement/entrainment sampling which we would continue to do every other week for a total of 26 surveys and also for only the impingement sampling which would be done on alternating weeks. If the EPA and Hawaii DOH agree that the biweekly impingment sampling is adequate we will only conduct the biweekly impingement/entrainment sampling. The total cost estimate for the biweekly sampling is $445,000, which includes all of the sample collection, preservation, and shipping by AECOS, and sample processing and data and project management by Tenera. If the impingement sampling needs to continue on a weekly basis the budget would increase by $138,000 for a total of approximately $583,000. The details of the budget are shown in the following table.

Cost Estimates for Continued Impingement and Entrainment Sampling at Hawaiian Electric Honolulu, Kahe, and Waiau Generating Stations

Tasks		Cost($)
AECOS Cost per Survey		5,550
Total Processing Cost/Survey		11,067
Total per Survey		16,617
Total Cost for 26 Surveys		432,042
One-time costs		2,500
QC Costs - two trips at $5,000 per trip		10,000
Total for 26 Impingement/Entrainment Surveys		**444,542**
Impingement Only Surveys	AECOS	4,600
	Tenera	720
Total for 26 Impingement Surveys		**138,320**
Total for 52 Surveys		**582,862**

All of the work would continue to be conducted on a time and materials basis using the current 2007 labor rates and the terms and conditions of the existing HECO contract with Tenera.

Thank you for your continued confidence in Tenera. We look forward to working with you and the other staff at HECO on your continuing 316(b) compliance efforts. Please contact me at your convenience if there are any questions regarding this information.

Sincerely,

John Steinbeck
Vice President

CWA-2.5 (HECO)
316(b)

INTEROFFICE CORRESPONDENCE

Hawaiian Electric Co., Inc.

June 21, 2007

To: Tom Simmons
Tom Joaquin
T. Michael May

From: Sherri-Ann Loo

Subject: Work Authorization Amendment
Additional Clean Water Act Section 316(b) Monitoring

In light of the recent Court decision to remand the Clean Water Act §316(b) rule back to EPA, and EPA's subsequent decision to suspend the rule, we are continuing with compliance work at Kahe, Waiau and Honolulu in preparation for the inevitable re-issuance of the §316(b) rule. EPA's main interim compliance guidance to the States due to the suspension of the rule is to handle §316(b) compliance on a "best professional judgment" (BPJ) basis. Under BPJ, demonstrating that current levels of impingement and entrainment do not represent adverse environmental impacts will be one of the primary criteria used by regulators in determining §316(b) compliance. Two projects that we have earmarked for 2007 that are in line with EPA guidance are continued impingement and entrainment monitoring, and a BPJ compliance project (including closed cycle cooling evaluation, BPJ determination [to be used to revise our NPDES permits accordingly], and fish protection technologies investigations).

Enclosed for your approval is Amendment No. 1 to Tenera Environmental's existing Work Authorization, which authorizes Tenera to continue impingement and entrainment monitoring work for at least another year. Our current Work Authorization for Tenera will be amended to include an additional year of monitoring at a cost of about $583,000. The contract period will overlap into 2008. Currently HECO has one year of monitoring data that was collected from April 2006 to April 2007. The data collected over the past year show relatively low levels of impingement of adult and juvenile fish and invertebrates at all three facilities. Additional data collection is critical for the following reasons: to confirm the first year's low impingement levels, to assure the regulators that our database is representative of baseline conditions at the facilities, and to satisfy an anticipated motion by the Department of Health to continue monitoring as a BPJ requirement or discharge permit condition. The baseline estimates of impingement and entrainment also will be used to determine the appropriate technology (i.e., traveling screen upgrades, fish diversion and/or return systems) necessary for compliance with the §316(b) regulations. Since the cost associated with any technology is significant, the accuracy of the baseline impacts is critical for the selection of appropriate technology.

We earlier received approval to proceed with an EPRI Supplemental Project Agreement that provides for partial funding of a project entitled "Section 316(b) BPJ Compliance Support Services." The proposed work by EPRI Solutions has been approved for EPRI Tailored

Tom Simmons
June-25, 2007

Collobaration (TC) and TC matching funds. EPRI TC and TC matching funds will cover $101,800 of the total contract amount of $190,000. The Environmental Department will be responsible for the balance of the contract amount (i.e., $88,200). This project goes hand in hand with Tenera's work. EPRI Solutions' assessment of what constitutes Best Professional Judgment is dependent upon the data collected and analyzed by Tenera.

In summary, although the current §316(b) rule has been suspended by EPA, we are proceedng with additional data collection, BPJ work and technologies review to align ourselves with other utilities (i.e., to improve our position) and prepare for the inevitable re-issuance of the §316(b) rule. Both projects and project cost estimates have been included in the company's most recent rate case CA-IR response. Your approval of this Work Amendment is appreciated.

If you have any questions, or require additional information please contract Donn Fukuda at x4525.

Enclosure

TENERA Environmental

April 4, 2007

Mr. Kirk Tomita
Hawaiian Electric Company
170 Ala Moana Blvd.
Honolulu, HI 96813

Subject: Cost estimates for completing sample processing of 2006-2007 entrainment samples and continued impingement and entrainment sampling for 2007 and 2008 at the Hawaiian Electric Honolulu, Kahe, and Waiau Generating Stations

Dear Mr. Tomita,

As we discussed during our meeting in Palo Alto, I am submitting the cost estimates for completing sample processing of 2006-2007 entrainment samples and continued impingement and entrainment sampling for 2007 and 2008 at the Hawaiian Electric Honolulu, Kahe, and Waiau Generating Stations.

We recently submitted the invoice for the work completed during February 2007 that increased the total expenditures on the project to $573,654. The March invoice will total approximately $60,000 which includes Tenera's continuing sample processing and the final billing for AECOS. This results in a remaining balance on the contract of approximately $260,000. We anticipate that the cost for the remaining processing will total approximately $130,000 leaving a balance of approximately $130,000. All of these cost estimates are subject to change, but I am certain that the project will be completed under the contract total largely due to the reduced entrainment sampling effort starting in August.

As we discussed, the cost to conduct an additional year of sampling depend on sampling frequency for impingement. I have received estimates from AECOS for the continued sampling effort. They provided costs for the combined impingement/entrainment sampling which we would continue to do every other week for a total of 26 surveys and also for only the impingement sampling which would be done on alternating weeks. If the EPA and Hawaii DOH agree that the biweekly impingment sampling is adequate we will only conduct the biweekly impingement/entrainment sampling. The total cost estimate for the biweekly sampling is $445,000, which includes all of the sample collection, preservation, and shipping by AECOS, and sample processing and data and project management by Tenera. If the impingement sampling needs to continue on a weekly basis the budget would increase by $138,000 for a total of approximately $583,000. The details of the budget are shown in the following table.

Cost Estimates for Continued Impingement and Entrainment Sampling at Hawaiian Electric Honolulu, Kahe, and Waiau Generating Stations

Tasks		**Cost($)**
AECOS Cost per Survey		5,550
Total Processing Cost/Survey		11,067
Total per Survey		16,617
Total Cost for 26 Surveys		432,042
One-time costs		2,500
QC Costs - two trips at $5,000 per trip		10,000
Total for 26 Impingement/Entrainment Surveys		**444,542**
Impingement Only Surveys	AECOS	4,600
	Tenera	720
Total for 26 Impingement Surveys		**138,320**
Total for 52 Surveys		**582,862**

All of the work would continue to be conducted on a time and materials basis using the current 2007 labor rates and the terms and conditions of the existing HECO contract with Tenera.

Thank you for your continued confidence in Tenera. We look forward to working with you and the other staff at HECO on your continuing 316(b) compliance efforts. Please contact me at your convenience if there are any questions regarding this information.

Sincerely,

John Steinbeck
Vice President

AMENDMENT NO. 1 TO AUTHORIZATION NO. 01
MASTER CONTRACT MSTR-JW-06-001

UNDER **SERVICE CONTRACT NO. PJA-06-002,** PORTION 01, ELEMENT 01
for **316(b) Sampling at Honolulu, Kahe and Waiau Generating Stations**

Hawaiian Electric Company, Inc. (HECO) and Tenera Environmental (Consultant) agree to amend Authorization No. 01 of the Consultant Services Master Agreement No. MSTR-JW-06-001, dated January 12, 2006, as follows:

Previous total not-to-exceed amount for Authorization No. 01	$897,000.00
Total not-to-exceed cost for Amendment No. 1 work	$582,862.00
New total not-to-exceed amount for Authorization No. 01	$1,479,862.00

Kirk Tomita is the designated HECO representative for this work.

Amendment 1 is required for an additional year of impingement and entrainment monitoring at HECO's Honolulu, Kahe and Waiau generating stations. Currently HECO has one year of monitoring data that was collected from April 2006 to April 2007[DTF1]. The data collected over the past year show relatively low levels of impingement of adult and juvenile fish and invertebrates at all three facilities. The additional year of data will be used to confirm the low impingement levels.

Although the current 316(b) rule has been suspended by EPA, continued data collection is still important to prepare for the inevitable re-issuance of the 316(b) rule. The agreed upon detailed cost estimate for the 2007-2008 monitoring is provided in the attachment.

Except as provided herein, the terms of said Agreement shall remain the same and are incorporated by reference herein.

THE ABOVE AMENDMENT IS ACCEPTED BY:

TENERA ENVIRONMENTAL (Consultant)

Date: 6/9/07 By: _____
John Steinbeck
Its Vice President

HAWAIIAN ELECTRIC COMPANY, INC.
(Company)

Date: _____ By: _____
Sherri-Ann Loo
Its Manager, Environmental

Date: _____ By: _____
Thomas C. Simmons
Its Vice President, Power Supply

Date: _____ By: _____
Thomas L. Joaquin
Its Sr. Vice President, Operations

Date: _____ By: _____
T. Michael May
Its President and CEO

Fukuda, Donn

From: Tomita, Kirk
Sent: Tuesday, June 05, 2007 3:44 PM
To: Fukuda, Donn
Subject: FW: Participation in the California 316b Project
Attachments: HECO 316(b) Proposal.doc; executed PO 316b HECO.PDF

From: Toth, Cynthia [mailto:CToth@eprisolutions.com]
Sent: Thursday, July 20, 2006 11:05 AM
To: Tomita, Kirk
Cc: Taylor, Tina; Bailey, David; Grant, Akosua; Williams, Celia
Subject: Participation in the California 316b Project

Mr. Tomita,

We had previously sent you the attached proposal for HECO's participation in the California 316b Project. With that proposal we had sent our Billable Services Agreement to serve as the contracting vehicle. My project manager has informed me that instead of executing that agreement, HECO would like to participate in the project through an amendment to an existing project they already have in place with us. That is acceptable to us. Because HECO issued a PO for the previous project (attached), you will need to generate the necessary amendment or change order. I would like to request that there be a specific notation within the document which states that the original project was time and materials but the services provided under this additional scope of work will be performed for a fixed price of $5,917.

Please contact me with questions of a contractual or administrative nature and contact Tina Taylor at (650) 561-5301 or at ttaylor@eprisolutions.com with questions of a technical nature.

Thank you for the opportunity to submit this proposal.

Cindy Toth
Contract Specialist
EPRI Solutions, Inc.
942 Corridor Park Blvd.
Knoxville, TN 37932
Phone: (865) 218-8106
Fax: (865) 218-8085
ctoth@eprisolutions.com

EPRI SOLUTIONS

942 Corridor Park Boulevard
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Proposal for:

California 316(b) Project

ESI Project No. 06-00787

June 12, 2006
(ESI CRM 06-00822)

HECO

Kahe Station

California 316(b) Project
Task 1: Closed-Cycle Cooling Feasibility and Cost Project

The goal of the project is to identify all the factors that affect the feasibility and cost of retrofits and to provide an approach for evaluating them in specific situations. This will serve two purposes:

1. To inform the State and Regional Water Boards and other stakeholders of the cost and feasibility issues, and
2. To provide a consistent framework so that each facility can develop a detailed but conceptual framework to prepare a site specific conceptual feasibility and cost estimate.

The initial focus of the proposed study was on the engineering and environmental issues associated with retrofitting existing facilities with alternative cooling systems. However, based on experience in a number of new generation and transmission licensing projects, it was realized that permitting issues, local ordinances, environmental justice issues, lawsuits, etc., can often become major obstacles in the licensing process and have a significant impact on the feasibility and cost for a major capital project such as a cooling tower retrofit. Clearly, these issues would need to be included on the list of potential factors to be considered and addressed if retrofits were to take place at California facilities. It is often difficult to anticipate which ones will emerge until the local community is actually faced with a license proceeding to pursue construction. At this point, communities and stakeholders mobilize in opposition or use the project as reason to argue for retirement of the whole facility. Therefore, our intent in this study is to consider these issues as factors and do so at a level that meets the customer's expectations for the project.

The specific issues include:

- Social factors
- Legal issues
- Real estate costs
- Permitting costs and issues
- Local or city ordinances
- Certain State or Federal statutes and/or regulations including the California Coastal Act, the Warren Alquist Act and CEQA
- Alternative sources of cooling water including freshwater and reclaimed water and costs and issues for transporting that water to the facility (i.e., what is between the water source and the cooling tower)
- Alternative scenarios to provide replacement power during a period of large scale retrofits through new construction and/or power purchase agreements and the costs of ensuring adequate transmission capacity to get the power where it is needed.
- Alternative scenarios and to provide replacement power as a result of lost generation due to energy penalties as a result of retrofits through new construction and/or power purchase agreements and the costs of ensuring adequate transmission capacity to get the power where it is needed.

The last two bullets also introduce the issue of the need to replace lost generation due to Unit retirements since for many Units, the high capital costs and energy penalties would not be justified considering the remaining facility life and current low capacity utilization.

Some of these items require specialized, non-engineering expertise to be addressed in depth. Others require site-specific information and experience in order to assess their importance.

So, the issue is at what level these issues need to be addressed. There are two approaches that can be used depending on preferences as follows:

The first option is to include them in the list of key factors that need to be considered and provide a short description of the potential issue. We can discuss that their significance will vary depending on the facility and its location and that they have the potential to be major feasibility issues and/or cost drivers. We would then request information from the staff of those participating in the study on the likely significance and/or cost of such issues in order to include meaningful examples for California retrofits. We would also use any readily available information from actual retrofits in California or major retrofit studies such as those conducted at Diablo Canyon and SONGS. This is the approach proposed in the current revised scope of work to address the comments. Using this approach, these issues could be included and not affect the project cost.

The alternative would be to include additional expertise to cover these issues in more detail. For example, a study could be conducted to develop cost estimates and a more in-depth discussion of replacement power issues and alternatives. There are quite a number of alternatives that could be considered. The analysis could include supporting graphics and tables. The same more detailed analysis could be done for the other bullets with potential cost impact ranges provided for facilities. However, pursuing this approach would require a reassessment of the project cost. Another concern is that the cost ranges to address some of these issues could be so high and some of the scenarios, such as providing replacement power, would be somewhat speculative to cover the full range of scenarios. The result could be viewed by the Water Boards and stakeholders as attempts to artificially inflate costs. This, of course, would defeat the whole purpose of the external report.

Attachment A to Task 1

Closed-cycle Cooling Conversions at Once-through Cooled Plants: A Study of Costs and Related Issues

Background

Recent resolutions by the California State Lands Commission and Ocean Protection Council have raised the possibility that power plants on the California coast, currently operating with once-through cooling, will be required to evaluate and perhaps adopt methods to reduce the impact of the cooling water intake on the ocean's or bay's ecology. A variety of approaches might be considered including the conversion of the plant cooling system from once-through to recirculated wet, dry or hybrid cooling. In addition, a number of Regional Water Boards are requiring that facility Comprehensive Demonstration Studies (CDS's) include information on the costs to retrofit facilities with wet or dry closed-cycle cooling.

While such retrofits will significantly reduce the amount of water withdrawn from the ocean or bay, they do so at a cost. The cost is not only the initial capital cost of the purchase and installation of the new cooling system, but also the continuing costs of reduced plant efficiency and capacity, increased operating power requirements, increased system O&M and potential other environmental effects associated with closed-cycle cooling.

1. There are 18 coastal plants in California that may need to evaluate closed-cycle retrofits. Nearly all are multi-unit plants and there are approximately 60 separate units that might need to be considered. In addition, there are three multi-unit plants in Hawaii that may need to assess the retrofit option.
2. Plant retrofits are inherently more complex than new plant construction. Therefore, not only is the cost of retrofitting of a recirculating cooling system at an existing once-through cooled plant nearly always significantly higher than that of installing a comparable system during the construction of a new plant, but it is also much more variable and much more difficult to determine.
3. A retrofit will also involve the loss of generation during the demolition and construction period. With the possibility of 60 units being affected, it is likely that multiple units will be out of service at the same time. Higher cost replacement power will have to be purchased if sufficient generation and transmission resources are available. If not, blackouts are possible.

As an example, in the past five years at least three different estimates of the cost of retrofitting the two units at Diablo Canyon with recirculating cooling using mechanical draft wet cooling towers have been published in the public domain. While the first (Ref. 1) was estimated with simple scaling laws from a set of base cases at other sites, the other two were based on site visits and examinations by established engineering firms (Refs. 2 and 3). The estimates varied by nearly a factor of four from ~$250 million to close to $1 billion.

This example is merely to indicate the difficulty, even after careful, site-specific study by competent, experienced engineering teams, in developing accurate, reliable estimates. Further, it reflects potential differences in estimates depending on the nature of the specific parameters included in the estimate and level of evaluation regarding those parameters.

Scope of Work

Based on the competing needs to develop short-term information on retrofit costs to inform state cooling water policy and the potential need for more detailed specific information for use in CDSs, a two-phase approach is proposed.

Phase I: Goal

The goals of Phase I include:

1. Developing a peer reviewed technical report that can be used externally to document:
    a. feasibility of closed-cycle cooling retrofits (feasibility will be based on the definition in the CEQA guideline definition)
    b. the costs of wet closed-cycle cooling retrofits compared to new facility installations
    c. an assessment of the feasibility of dry cooling retrofits at most facilities
    d. the environmental dis-benefits of wet closed-cycle cooling
2. Establish consensus on the specific parameters and level of detail for site-specific facility estimates for use in the CDS.
3. An estimate of costs to prepare site-specific estimates based on the previous goal

Phase 1: Scope and Methodology

The overall assessment of the factors that affect feasibility and cost will include a description of closed-cycle cooling alternatives that would include wet closed-cycle (mechanical and natural draft), dry (i.e., air cooled) cooling and hybrid cooling. Photographs of each type will be included in the description. The report will also include a chart or diagram showing the process for assessing feasibility and costs for use by participating Companies at their facilities. The chart and/or diagram will be based at least on part on information from facilities that have done retrofits or conducted site-specific retrofit studies. The report will include a list of agency determinations where the feasibility of alternative cooling has been conducted in California and include renderings of alternative cooling options for facilities where those visuals are available.

The first phase would consist of eight tasks.

1. Identify and describe all of the elements that could impact the feasibility and costs incurred in a cooling system retrofit including:
    a. Initial capital costs (i.e., equipment procurement including costs for tower, circulating pumps and piping, intake/blowdown pumps and piping, intake bay modifications, etc.). This will include consideration of the location or locations where cooling towers would be placed and the obstacles or issues of installing piping from that location to the condensers as well as the cost implications of pumps to recirculate the cooling water.
    b. Installation costs (i.e., construction costs including site preparation, tower/basin erection, circulating water lines, condenser piping modifications, intake bay modifications, etc.)
    c. Continuing power costs (pumps, fans)
    d. Increased O&M costs including loss of efficiency due to use of closed-cycle cooling (i.e., water treatment for use and discharge, solid waste disposal, tower upkeep and repair, etc.)

e. Energy penalty costs (increased heat rate from elevated turbine backpressure operation)
f. Capacity penalty costs (imposed load reductions from inability to maintain adequate backpressure during high temperature periods)
g. Loss of generation (lost income) during the demolition and construction period
h. Cost of purchased power and transmission access to replace lost generation during the demolition and construction period and/or impacts to the generation and transmission facilities in California of the reduced generation capability of 60 units. This estimate will be provided in the form of the estimated cost of a new generating Unit(s) to replace lost power and/or costs of new transmission facilities to import power to make up for the lost generation. The cost of new generation will consider the need of replacement power to comply with new emission criteria for air pollutants
i. Sources of closed-cycle cooling make-up water (salt water, freshwater and/or reclaimed water)
j. Land acquisition (if needed)
k. Permitting cost and the cost of any necessary mitigation. Permitting feasibility and costs will consider the nature of permits required by local and regional land use ordinances including visual resources and aesthetics, noise and competing land use plans and/or projects and compliance with other statutes such as California Coastal Act, Warren Alquist Act and CEQA.

2. Develop a methodology for selecting the preferred recirculating system design at a site. This requires a balancing of the several cost elements from Task 1 to choose the appropriate trade-offs between the initial capital costs and the continuing operating and penalty costs. A typical choice between a "low first cost" tower and a "minimum evaluated cost" tower depends on factors such as projected fuel costs, projected power price, seasonal variation in power price, expected plant capacity factor and expected remaining plant life.

3. Identify and evaluate those characteristics that can significantly affect the project costs, such as
   a. Availability of space to site a cooling tower
   b. Distance of tower site from turbine/condenser
   c. Existing interferences to the installation of new circulating water lines
   d. Site geology and topography affecting site preparation, tower underpinning, seismic bracing and plume interference/recirculation
   e. Drift or plume problems on- and off-site
   f. Noise
   g. Alternative sources of closed-cycle cooling makeup water
   h. Aqueous discharge constraints on blowdown
   i. Need to re-optimize condenser and circulating water system or reinforce condenser for increased waterbox pressure.

4. Assemble currently available cost information from
   a. Plants that have actually completed retrofits
   b. Plants that have conducted in-house or contacted retrofit cost studies
   c. Plants that have made generic cost estimates.

   Much of this information has been assembled in previous and ongoing EPRI studies.

5. Based on plant descriptions provided in facility PICs and facility site plans, identify site-specific issues that would make wet closed cycle cooling more costly.
6. Develop a list of information that would be required from each plant in order to proceed with a site-specific analysis.
7. Conduct an analysis of the viability of dry and hybrid cooling for retrofit applications. It is possible to evaluate (and frequently dismiss) dry and hybrid cooling in retrofit applications on two bases.
    i. Plants originally designed for once-through cooling are equipped with turbines that are limited to operation at turbine exhaust pressures below 5 in Hga. Plants designed for dry cooling are equipped with turbines that can operate up to 8 in Hga or higher. The use of dry cooling on a turbine limited to 5 in. Hga would likely impose severe load reductions on the plant during summertime operation without a turbine retrofit.
    ii. Dry cooling requires direct ducting of steam from the turbine exhaust to an air-cooled condenser outside of, but close to, the turbine hall. This greatly complicates the retrofit.
    iii. Hybrid cooling can ameliorate the first problem but not the second.

    Based on turbine characteristic curves, on meteorological data and on information about the details of the existing condenser installation and surrounding building structure obtained from each of the plants, a brief analysis of the viability of dry and hybrid cooling at each of the sites will be performed.
8. Identify and discuss the environmental effects of the various types of closed-cycle cooling in comparison to once-through cooling.

While the use of closed-cycle cooling will substantially reduce the amount of cooling water drawn into the plant, it should be recognized that recirculated cooling systems are not without environmental impacts of their own, some of which are not present with once-through cooling systems. These include

- Water consumption
- Water and waste water discharge
- Brine and sludge disposal
- Drift emissions
- Visible plume
- Noise
- Aesthetics
- Other air emissions (from tower or from replacement energy generation) and from the cooling tower plume (i.e., PM10)
- Indirect environmental impacts associated with power production to make up efficiency losses
- Increased natural gas consumption
- Increased production of greenhouse gases
- Increased air emissions from the stacks and cooling towers and the cost to purchase emission off sets
- Terrestrial impacts due to closed-cycle cooling system installation including the installation of piping.

The report would also discuss these same types of issues that could result from the construction of new generation to replace power due to the loss of generation availability due to retrofits.

Deliverables:

A. Provide a technical report based on the work performed in Tasks 1-8. The report for external use will consider the potential cost factors in context with the results of Project 2 that is focused on the impacts of once through cooling by California facilities on coastal fisheries. All tasks will be performed based on:

1. information available in the open literature from prior site-specific studies or in the grey literature of permit applications
2. site plans provided by Companies for facilities participating in the project
3. facility PICs that provide facility descriptions
4. input from facilities regarding some of the listed factors in the SOW. It is important to note that a number of factors that can significantly impact the feasibility and cost of alternatives to once through cooling. These factors include legal issues, social issues, local and city ordinances, certain State Statutes and Regulations (i.e., California Coastal Act, Warren Alquist Act, CEQA, etc), permitting costs and alternative sources of cooling water. While such factors can be listed, their significance can range from making a retrofit infeasible to being a minor or non-issue depending on the site. For the purposes of this project, it is felt that such issues should be listed as potentially significant issues and include examples in the external report of their potential impact at one or more of California's participating facilities. Rather than increasing the cost of the project to include the necessary experts to cover legal issues, social issues, real estate pricing, significant local ordinances, alternative sources of cooling tower make-up water, it is proposed to use two methods to obtain information on these issues for California facilities. They are to use such information as it is available from California retrofits or retrofit studies (i.e., Diablo Canyon and SONGS) or to make use of experts in participating Companies as sources of information for use as examples of how these factors can influence costs. Early in the project, a questionnaire will be provide to Companies to solicit information for use as examples or antidotal information on these issues for use in the report. This solicitation for information would include:
   - Identification by Companies or facilities on potential types and/or location of alternative water sources in reasonable proximity to facilities and description of the areas through which pipelines would have to be installed.
   - Some information on the quality of the potential water source and/or source to acquire that information.
   - Information as to which Companies and/or facilities have conducted retrofits or retrofit studies in addition to the well known cases (i.e., SONGS and Diablo Canyon)
   - Legal issues as per CEQA's definition of feasibility that would be anticipated by each facility
   - Social issues as defined by the CEQA's definition of feasibility

- A list of key permits and the anticipated feasibility and cost of obtaining such permits and complying with key regulations and statutes (i.e., California Coastal Act, Warren-Alquist, CEQA, and especially city ordinances)
- Impacts on system reliability

B. A framework of parameters and level of detail for performing more detailed site-specific analysis. Note that site-specific data to determine the cost implications of ameliorating these effects, as for example with noise reduction measures or plume abatement towers, will be gathered and organized for use in future cost estimating efforts.

Phases 2

Based on the results of Phase I, Companies may want to use the framework to develop their own site-specific cost estimates independently, may want to do the majority of work on their own with some level of outside support or may wish to have site-specific estimates developed by independent consultants that may or may not include an EPRI Solutions Phase 2 project. The nature and need for a Phase 2 project will be discussed with project participants at the conclusion of Phase 1.

References:

1. Yasi, D.E. and T. A. Adams, Jr., "Engineering Cost Estimate for Retrofitting Cooling Systems at Existing Facilities," Stone & Webster report to UWAG, July 2003.
2. "Evaluation of Cooling System Alternatives at Diablo Canyon Power Plant," Tetra Tech, Inc. report to the California Regional Water Resources Board, November 2002.
3. "Feasibility of Retrofitting Cooling Towers at Diablo Canyon Power Plant, Units 1 and 2," Burns Engineering report, 2003.

EPRI SOLUTIONS

BILLABLE SERVICES AGREEMENT NO. 542-06

This Billable Services Agreement ("Agreement") is entered into as of the date that this Agreement is fully executed and signed by the last party affixing its authorized signature hereto (the "Effective Date") between EPRI Solutions, Inc., a Delaware Corporation ("ESI"), and the Customer identified in the signature block below ("Customer").

I. **Services.** Pursuant to the terms of this Agreement, ESI will provide the consulting services ("Services") described in Proposal for "California 316(b) Project," ESI Project No. 06-00787, dated June 12, 2006, that is attached hereto as Attachment 1 and made a part hereof by reference (the Statement of Work or SOW). The Parties' Project Managers for this effort are identified as follows:

For ESI: Tina Taylor
For Customer: Kirk Tomita

Any change to the Parties' Project Managers shall be made in writing as set forth in **Paragraph XII,** Notice.

II. **Charges and Payment.** Customer agrees to pay ESI's fixed fee for the Services, as set forth in the SOW. The fixed fee payable under this contract is net of, and shall not be reduced by, charges, taxes or offsets of any kind or nature imposed by any governmental agency or authority of Customer's domiciliary country or of any other country other than the United States of America; Customer shall be solely responsible for payment of any such charges, taxes or offsets imposed on ESI hereunder. ESI shall provide an invoice to Customer to the address indicated in **Paragraph XII** upon full execution of this Agreement for Work performed hereunder. ESI's invoice shall reference this Billable Services Agreement number. Customer agrees to pay ESI's invoice within thirty (30) calendar days after the invoice date, in U.S. dollars. The total compensation under this Agreement is a fixed price of Five Thousand Nine Hundred Seventeen Dollars (US$5,917), which shall be due upon full execution of this Agreement.

III. **Change Requests.** Customer must request in writing any changes to the Services being performed by ESI. ESI shall not be obligated to perform changes unless and until duly authorized representatives of both Parties agree in writing to the change.

IV. **Term and Termination.** This Agreement will commence on the Effective Date and remain in effect until all the work has been completed by ESI and Customer has made full payment therefor. ESI may terminate this Agreement with or without cause by providing the other party with thirty (30) days written notice. Termination shall not relieve the parties of any obligation incurred prior to the date of termination. **Paragraphs II, V, VI, VIII, and XI** shall survive termination of this agreement.

V. **Title to Know-how.** Nothing in this Agreement shall be deemed to transfer to ESI any right, title, or interest in Customer's existing intellectual property. Services will be provided using software and hardware products, copyrights, inventions, trade secrets, and other intellectual property rights, and derivations thereof, in certain concepts, ideas, training materials, industry practices, and techniques, owned or licensed by ESI ("Intellectual Property"). ESI shall retain all right, title, and interest in Intellectual Property and any derivations thereof. Customer acknowledges that ESI or its parent company may publish reports containing information derived in whole or in part as a result of the Services provided hereunder but which do not include any of Customer's confidential or proprietary information. Customer agrees that Intellectual Property may be enhanced or modified in the performance of the Services, that Customer is granted no rights in Intellectual Property hereunder, and that the Agreement shall in no way impact ESI's rights in Intellectual Property or ESI's ability to perform similar services for third parties.

VI. **Nondisclosure.** The parties may provide to one another information that is confidential ("Confidential Information"). Confidential Information shall be limited to information clearly identified as confidential. Confidential Information shall not include information that: (a) is or becomes a part of the public domain through no act or omission of the receiving party; (b) was in the receiving party's lawful possession prior to the disclosure and had not been obtained by the receiving party either directly or indirectly from the disclosing party; (c) is lawfully disclosed to the receiving party by a third party without restriction on disclosure; (d) is independently developed by the receiving party; or (e) is disclosed by operation of law. The parties agree to hold each other's Confidential Information in confidence while the Services are being performed and for a period of three (3) years thereafter.

VII. **Right to Subcontract and Relationship.** ESI may use subcontractors in performing its obligations under this Agreement, and may assign its rights and/or obligations under this Agreement *to its affiliates, parent, and/or subsidiaries. Except for ESI's right to* subcontract and to make the assignments stated above, neither party may assign this Agreement in whole or in part without the written consent of the other. The terms of this Agreement shall bind and inure to the benefit of permitted assigns. ESI is an independent contractor, and nothing in this Agreement shall be construed to create a partnership, joint venture, or agency relationship between the parties. Each party will be solely responsible for payment of its employees' wages and related taxes, and shall maintain sufficient general liability and worker's compensation insurance.

VIII. **No Warranty and Limitation of Liability.** ESI shall use its best efforts to complete the Services as mutually agreed herein in a competent and professional manner, such as is normally exercised by recognized professionals in performing work of a similar nature. Except as so provided, ESI does not guarantee results and **ESI MAKES NO WARRANTIES, WHETHER EXPRESS OR IMPLIED, AND MAKES NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE.** ESI shall undertake to promptly correct any performance of Services that is deficient, provided that the deficiencies were not caused by lack of proper criteria and direction from the Customer, or any other act or failure to act of the Customer, and further provided that Customer has given written notice of such deficiencies within a reasonable time after the discovery thereof. Customer's exclusive remedy, and ESI's entire liability, shall be ESI's choice of either the re-performance of the Services or refund of the fees paid to ESI for any deficient Services.

Except as otherwise provided herein, the Parties shall not be liable to each other for any damages of any kind or nature arising out of or related to this Agreement or the performance or results of the Services. **IN NO EVENT SHALL EITHER PARTY BE LIABLE FOR ANY INDIRECT, INCIDENTAL, SPECIAL, OR CONSEQUENTIAL DAMAGES OR DAMAGES FOR LOSS OF PROFITS, REVENUE, DATA, OR USE, INCURRED BY EITHER PARTY OR ANY THIRD PARTY.** ESI's liability for damages under this Agreement shall in no event exceed the amount of fees paid by Customer pursuant to this Agreement. These provisions allocate the risks between ESI and Customer, and ESI's pricing reflects this allocation of risk and the limitation of liability specified herein.

IX. **Site Access.** Customer hereby grants ESI permission to access its site whereupon the Services are to be performed during normal business hours, unless otherwise agreed, subject to completion of safety and/or security checks as requested by Customer. Customer shall provide ESI with any and all applicable rules, regulations, safety procedures and policies for its facility.

Customer shall be responsible for securing any other authorization necessary for ESI to perform the Services on the site.

X. Compliance. Each party agrees to comply with all relevant export laws and regulations of the United States and the country or territory in which the Services are provided to ensure that neither any deliverable nor any direct product thereof is (a) exported, directly or indirectly, in violation of the Export Laws, or (b) intended to be used for any purposes prohibited by the Export Laws. The parties further agree to comply with any applicable provisions of the Foreign Corrupt Practices and Patriot Acts.

XI. Governing Law, Arbitration and Jurisdiction. The laws of the State of Tennessee, USA, shall govern all matters arising out of or relating to this Agreement. Any dispute hereunder that cannot be resolved through amicable means shall be fully and finally resolved through binding arbitration under the Commercial Arbitration Rules of the American Arbitration Association (or if the Customer is located in a non-U.S. territory, the International Chamber of Commerce) by one or more arbitrators chosen under said Rules. Venue for any arbitration shall be in Knoxville, Tennessee USA. The parties consent to the jurisdiction and venue of the courts sitting in Knox County, Tennessee. Any arbitration award shall be payable in U.S. Dollars and enforceable in any court of competent jurisdiction.

XII. Notice. All notices ***including invoices*** sent hereunder shall be in writing and shall be deemed to have been given when mailed by first class mail to the address listed in this paragraph below. To expedite order processing, Customer agrees that ESI may treat documents faxed by Customer to ESI as original documents.

EPRI Solutions, Inc.
Attn: Contracts Office
942 Corridor Park Blvd.
Knoxville TN 37932
Email: contracts@eprisolutions.com
Phone: (865) 218-8003; Fax: (865) 218-8085

Hawaiian Electric Company
Attn.: Accounts Payable
P.O. Box 2750
Honolulu, HI 96840-0001
Email:
Phone/Fax: (808) 543-7937 / (808) 543-7396

XIII. Severability, Entire Agreement, and Waiver. If any provision of this Agreement is held to be invalid or unenforceable, the remaining provisions of this Agreement will remain in full force. The waiver by either party of any breach of this Agreement shall not constitute a waiver of any other breach. This Agreement constitutes the complete agreement between the parties and supersedes all previous and contemporaneous agreements, written or oral, concerning the subject matter hereof. This Agreement may only be modified in a writing signed by a duly authorized representative of each party. It is expressly agreed that the terms and conditions of this Agreement supersede the terms of Customer's purchase order, the pre-printed terms of which shall have no force or effect.

Intending to be legally bound, the parties' duly authorized representatives have executed this Agreement below.

EPRI Solutions, Inc. ("ESI")
942 Corridor Park Boulevard
Knoxville, Tennessee 37932
Phone: (865) 218-8000 Fax: (865) 218-8085
www.eprisolutions.com

Celia Townsend-Williams — June 20, 2006
Celia Townsend-Williams — Date
Senior Contracts Manager

Hawaiian Electric Company
900 Richards Street
Honolulu, Hawaii 96840-0001
Phone: 808 543-4528
Fax: 808 543-4511

Donn Fukuda — 12/18/06
Donn Fukuda — Date
Printed Name — Principal Env. Scientist
Title

EPRI | ELECTRIC POWER RESEARCH INSTITUTE

Supplemental Project Agreement

1. **Project Title; Agreement, Funder and Project Numbers:** This Supplemental Project Agreement applies to the Project entitled: ***"§316(b) BPJ Compliance Support Services for Hawaiian Electric Power Company's Honolulu, Kahe and Waiau Generating Stations".*** The Parties will reference Supplemental Project Agreement number **TC/CF 011950-11156, (Project ID No. 066063)** in all correspondence. The terms and conditions of the Master Agreement between the Parties dated January 1, 2007 are incorporated herein and govern all Work hereunder. Any Purchase Order issued by Member pursuant to this Agreement is solely for Member's internal accounting requirements and, as such, the terms and conditions of such Purchase Order are superseded by the terms and conditions set forth in this Agreement.

2. **Contact Information:**

Contact	Name	Phone/Fax	Email
EPRI Project Manager:	Tina Taylor	650-855-2819 / 2373	ttaylor@epri.com
EPRI Contracts:	Josephine M. Erickson	650-855-2003 / 1032	jerickson@epri.com
EPRI Sector Account Executive:	John Allen Flynt	650-855-2856	jflynt@epri.com
Member Contracts	Arthur Seki,	808-543-7987 / 1581	arthur.seki@heco.com
Member Project Manager:	Kirk Tomita	808-543-4528	kirk.tomita@heco.com

3. **Project Funding in U.S. Dollars:**

Funding Year	-2007-	-2008-	-2009-	-2010-	TOTAL
Funder Cofunding	$88,200				$88,200
Funder TC Funds	$50,900				$50,900
EPRI TC Match	$50,900				$50,900
Total U.S. Dollars	$190,000				$190,000

4. **Project Objectives, Tasks and Deliverables:** See Attached Exhibit 1, incorporated herein by reference.

5. **Invoicing:** Funder will only be invoiced for $88,200, the balance of $50,900 will be paid out of Funder's deposit account.

☐ Current year payment enclosed (This form is the invoice for the current year).

☐ Address invoices to: Arthur Seki, , Director of Technology
Hawaiian Electric Company, Inc.
820 Ward Ave (M/S WA3-YP)
Honolulu, HI 96814-2109
Phone/Fax: 808-543-7987 / 1581
E-mail: Arthur.Seki@heco.com

IN WITNESS WHEREOF, the parties hereto have caused this Supplemental Project Agreement to be executed by their duly authorized representatives.

Approval / HAWAIIAN ELECTRIC COMPANY, INC.	Approval / ELECTRIC POWER RESEARCH INSTITUTE, INC.
P.O. Box 2750 Honolulu, HI 96840-001 Phone/Fax: 808-543-4528 / 4511	Post Office Box 10412 3420 Hillview Avenue Palo Alto, Ca 94303 Phone/Fax: 650-855-2003 / 1032
Signature: Thomas C. Simmons Name: Thomas C. Simmons Title: Vice President, Power Supply Date:	Signature: _____ Name: Josephine M. Erickson, Title: Revenue Contract Negotiator Date:

ENDORSEMENT: EPRI is hereby authorized to release Tailored Collaboration Matching Funds from the account of the Hawaiian Electric Company, Inc. as set forth in this Agreement.

By: _____ 6/27/07
Arthur Seki, , Director of Technology — Date

Exhibit 1
To
Supplemental Project Agreement
TC/CF 011950-11156 (Project ID No. 066063)

"§316(b) BPJ Compliance Support Services for Hawaiian Electric Power Company's Honolulu, Kahe and Waiau Generating Stations"

A. Background, Objectives and New Learnings:

Hawaiian Electric Power Company (HECO) has requested that EPRI provide §316(b) compliance assistance in satisfying §316(b) requirements of the Clean Water Act. HECO's Honolulu, Kahe and Waiau Generating Stations (Honolulu, Kahe and Waiau) all use once through cooling (OTC). The EPA has issued a memorandum to the Regions announcing it intends to withdraw the Phase II Rule in its entirety as a result of the recent Court Decision (Decision) on Riverkeeper 2. The memo further indicates that EPA Regional Offices are to implement §316(b) on a Best Professional Judgment (BPJ) basis in NPDES permits until the Court Decision issues are resolved. At this time EPA is considering resolution options that include a re-hearing in the Second Circuit, appealing to the Supreme Court or making revisions to the Rule to address remanded portions of the Rule. It is likely to be several years before the Court Decision is resolved either through further litigation and/or further Rulemaking.

The goal of this project is to support HECO in development of a cost effective compliance approach for Honolulu, Kahe and Waiau under BPJ and to ensure that HECO has the necessary information to comply with the federal Phase II Rule once the Decision issues are resolved.

EPRI will complete this work in partnership with Alden Research Laboratory Inc. (Alden) and Tenera Environmental Inc (Tenera).

As a result of the Decision, HECO will go forward with two tasks. The first task is to support HECO in working with the Hawaiian Department of Health (DOH) on a cost effective BPJ approach and implementation of the approach. The second task will be to provide detailed cost estimates on the feasibility, cost and effectiveness of alternative fish protection technologies and operational measures.

This research program will support testing of EPRI's 316(b)-related technical resource information. Due to the changes in the compliance options available and the unique characteristics of HECO's facilities and fish population, this project is expected to add to the body of knowledge for using technologies to comply with the 316(b) Rule. Modifications to EPRI's technical resource information will be made, as necessary, and distributed to EPRI's 316 Fish Protection Program funders.

B. Tasks:

Task 1 – Prepare BPJ §316(b) Compliance Documents: Honolulu, Kahe and Waiau all have language in their NPDES permits requiring that these facilities must comply with the Phase II Rule requirements that includes submittal of a Comprehensive Demonstrations in early January of 2008. This task will be to support HECO in negotiating an alternative BPJ approach for compliance for the three facilities and implementation of the approach. This project will be completed in three sub-tasks.

Task 1A – Prepare BPJ Approach Description for Submittal to DOH

The recommended approach for HECO's three OTC facilities is to develop draft permit language to substitute for the current §316(b) compliance language and provide the rationale in support of the proposed language. The recommended approach for all three facilities would be based on making a determination of whether "adverse environmental impact" (AEI) is occurring. This determination would be based on an analysis of the one year impingement mortality and entrainment study data collected in 2006/2007 to evaluate whether or not the level of losses indicate there is a reasonable potential for population level impacts to the species impinged and entrained. If there is no significant risk of AEI, then the existing cooling water intake structure (CWIS) should be deemed Best Technology Available (BTA) for this permit cycle or until the Court Decision issues are resolved.

Tenera has reported that impingement and entrainment losses for all three facilities are relatively small. The approach will be based on preparation of estimates of equivalent adult losses for commercial and recreational species and production foregone for forage species as a means of putting entrainment and juvenile fish losses into perspective for the AEI determination. The analysis will also include using available recreational and commercial fishing harvests as a further means of putting losses into perspective.

Task 1A will be to prepare a description of the approach and draft permit language for submittal to DOH. The accompanying language in support of the approach would explain that based on the relatively small losses (subject to final confirmation by Tenera) there is low potential for significant AEI. The language will further explain that due to the costs and uncertainty associated with BTA, no immediate change in BTA is warranted (i.e. the existing CWIS is BTA). At this point when the Decision issues are resolved, BTA could range from a determination that the existing CWIS is BTA under the Cost-Benefit Test (if that part of the Decision were overturned on appeal) to a determination that a closed-cycle cooling retrofit is required. Due to the wide range of uncertainty for BTA and low potential risk of AEI based on sampling results, no interim action is warranted under BPJ. The draft of the approach will be provided to HECO for review and comment and revisions will be made to address comments prior to providing HECO with the final document for transmittal to DOH.

Task 1B – Complete AEI Summary for Review by HECO

The first year of sampling is now concluding and final sample processing is being completed. Once the first year data set for each facility is available data analysis will be initiated. Annual, seasonal (monthly) and diel estimates of impingement and entrainment by species and life stage will be generated. Based upon available life history data for dominant impingement and entrained species and BPJ, estimates of equivalent adult (commercial and recreational species) and production foregone (forage species) estimates will be generated. These estimates will then be discussed in terms of potential significance to the affected populations or to local commercial and recreational fisheries. The results of the analysis will be discussed with HECO staff prior to preparation of the draft §316(b) document for each facility.

Task 1C – Complete AEI §316(b) Demonstration Study

This Task will consist of preparation of a report for each facility on the results of the AEI analysis. A draft report will be provided to HECO for review and comment and a final report will be provided to HECO that addresses the comments.

Task 2 – Prepare Detailed Fish Protection Technology and Operational Measures Analysis. HECO previously had Alden perform a preliminary assessment of alternative fish protection technologies as part of its §316(b) strategic compliance planning process. At that time use of restoration measures under.

Compliance Alternative 3 and/or use of the Cost/Benefit Test under Compliance Alternative 5 were identified as the most cost effective compliance alternatives. Unfortunately as a result of the Decision both these options were deemed unlawful. The chances of a reversal by the Second Circuit (i.e. assuming EPA were to ask for a re-hearing) are extremely small. Hunton & Williams indicates this almost never happens. If EPA appeals to the Supreme Court and the Court agrees to hear the case and overturns the Decision, detailed technology evaluations would be required by the current Rule no matter which compliance alternatives or options are required short of installing closed-cycle cooling. If EPA addresses remanded portions of the Rule, the Rule will be based on "best performing" technologies in the performance standard range. A detailed technology evaluation would serve several purposes that include:

- providing HECO with an updated detailed analysis of feasible compliance technologies and operational measures and their costs based on full quantity takeoff cost estimates and drawings of how such technologies might be deployed. This will provide HECO with an estimate of its financial exposure if the Court Decision remains unchanged.
- identification of any information gaps that would require additional information collection to confirm the feasibility, cost or performance of the technologies identified.
- demonstrating to DOH that HECO is proactively moving forward, recognizing that §316(b) compliance will be re-visited once the Court Decision has been resolved through further litigation and/or rulemaking.

Detailed Evaluation of Alternatives

The detailed evaluation would expand on the potential options identified in the appraisal-level assessment. This will include a more detailed assessment of feasibility for each of the options previously developed as well as additional technologies that have potential applicability. This project will be completed in two Tasks.

Task 2A – Facility Information Update and Review

In reviewing our existing information for Honolulu, Kahe and Waiau, we identified additional information needed for these facilities to complete the detailed alternatives analysis. A list of the needed information is provided in Attachment A of this proposal. The first Task will be acquisition and review of the additional information necessary for the analysis.

Task 2B – Detailed Fish Protection Alternatives Analysis

Detailed designs of each technology or operational change based on site-specific factors would be completed. Design drawings of each technology that holds potential to meet the performance standards will be created. In cases where technologies or operational changes are already being used, but which alone can not meet the performance standards, other technologies that could further reduce impingement mortality and entrainment (IM&E) to meet the standards will be evaluated. Estimates of direct costs will be developed for each technology evaluated in this task, as well as cost for operation and maintenance (O&M). These cost estimates will be based on quantity take-offs for the conceptual designs of each alternative and historic cost data developed for other power facilities. The costs developed in this task will be sufficient for use in a Comprehensive Cost Evaluation Study in the event that HECO wishes to conduct a Cost-Cost Test. Estimates of biological effectiveness will be developed for each alternative based on currently available data and information. These estimates of effectiveness will focus on Representative Species (RS) and lifestages based upon the recently collected impingement and entrainment data and can be used as input to models used to estimate the benefits associated with each alternative. The report will also discuss any significant uncertainties regarding the feasibility or

performance of each technology. Additionally, the report will identify the expected "best performing" technology as specified in the Decision.

All three stations will be required to meet the IM & E reduction standards. HECO is currently conducting biological sampling at each station. These data will be assessed relative to changes in species composition and abundance that may impact the selection of technologies. The efforts required for each facility are discussed below and a list of required information is provided as an attachment (Attachment A).

Waiau: In the preliminary evaluation, we identified seven technology or operational change options for meeting the performance standard:

- Coarse-mesh modified traveling screens
- Fine-mesh modified traveling screens
- Wide-slot wedgewire screens
- Narrow-slot wedgewire screens
- Barrier net
- Reduced pump flow
- Closed-cycle cooling

We will reassess most of the technologies identified in the preliminary evaluation for Waiau and provide greater detail on each option. Additional options will be considered based on the most current information available. At HECO's request, we will not investigate cooling towers further.

Kahe: As with Waiau, we will reassess most of the technologies identified in the preliminary evaluation for Kahe and provide greater detail on each option. Other options whose status has changed will be considered based on the most current information available. In the preliminary assessment, we identified seven technology or operational change options for meeting the performance standard:

- Coarse-mesh modified traveling screens
- Fine-mesh modified traveling screens
- Wide-slot wedgewire screens
- Narrow-slot wedgewire screens
- Barrier net
- Reduced flow
- Closed-cycle cooling

No further evaluation of closed-cycle cooling will be performed at this time.

Honolulu: The level of effort required for Honolulu will be similar to that described above. In the preliminary assessment, we have identified six technology or operational change options for meeting the performance standard:

- Coarse-mesh modified traveling screens
- Fine-mesh modified traveling screens
- Wide-slot wedgewire screens
- Narrow-slot wedgewire screens
- Reduced pump flow
- Closed-cycle cooling

Task 3: At the request of HECO we have budgeted the cost of a meeting to support HECO in discussing the results of the AEI submittal to the Board.

C. Deliverables: The following deliverables will be provided to HECO based on these projects.

1. A draft and final letter discussing the §316(b) BPJ approach and rationale and proposed permit language to substitute for the current §316(b) language.
2. Data summary of impingement and entrainment sampling results for Honolulu, Kahe and Waiau and AEI evaluation based on those results.
3. A draft and final report for Honolulu, Kahe and Waiau presenting the results of the BPJ AEI analysis.
4. A draft and final report will be prepared for Honolulu, Kahe and Waiau presenting the results of the fish protection technologies and operational measures analysis. The report for each facility will provide cost and performance estimates for technologies and identify the likely "best performing" technology.
5. A power point presentation for use in presenting the results of the AEI study to DOH.

The non-proprietary results of this work will be incorporated into EPRI R&D program 54, and made available to funding members of that program and to the public, for purchase or otherwise.

D. Estimated Period of Performance / Estimated Schedule: The following schedule is proposed for the project:

Activity	Schedule
Project 1	
Submittal of Draft BPJ Letter to HECO	Within 2 Weeks of Contract Award
Final BPJ Letter to HECO	Within 1 Week of Receipt of Comments
Submittal of AEI Assessments	August 15, 2007
Submittal of Draft AEI Assessment Report	October 15, 2007
Submittal of Final AEI Assessment Report	November 15, 2007 (Assumes comments provided by October 30, 2007)
Project 2	
Information Acquisition and Review Completion	Within 6 Weeks of Contract Award
Submittal of Draft Technologies Assessment	October 1, 2007
Submittal of Final Technologies Assessment	November 21, 2007 (Assumes comments received by October 21, 2007)
Meetings	
Presentation to DOH	3 weeks notice of meeting data for travel arrangements requested

Attachment A
Required Data

All facilities

- Updated biology
- Last five years of operating data, flow and generation.

Waiau missing data:

- What is the MW rating per unit?
- What is the mesh size, rotation speed, spray wash requirements and width of the Units 3-6 traveling water screens?
- Are the trash racks the same as originally equipped, or are they all made out of expanded steel mesh? What is the size of the openings?
- What are the rotation/cleaning schedules for all of the traveling water screens? (We are assuming several rotations per shift)
- What is the length of the intake pipe? Scale drawing showing the length?

Kahe missing data:

- What is the mesh size, rotation speed, spray wash requirements and width of the Units 1-6 traveling water screens?
- Where do the debris trough for each units discharge?
- We need a section drawing of Units 1-4 and 5 & 6.
- What is the distance between Jetties, are there any scale drawings?

Honolulu missing data

- What is the MW rating per unit?
- Site plan showing locations of intakes not in use
- Does the wash water pass through a trash basket to remove fish/debris?
- What is the bar size and spacing of the bars at the face of the intake tunnels? Is it the same diamond shape as Waiau?
- What is the spraywash volume and rotation speed of the traveling water screens?
- What is the length of the intake pipes?

**Proposal to Prepare the
§316(b) BPJ Compliance Support Services for
Hawaiian Electric Power Company's
Honolulu, Kahe and Waiau Generating Stations**

Introduction

Hawaiian Electric Power Company (HECO) has requested a proposal to use EPRI TC Funds to provide §316(b) compliance assistance in satisfying §316(b) requirements of the Clean Water Act. HECO's Honolulu, Kahe and Waiau Generating Stations (Honolulu, Kahe and Waiau) all use once through cooling (OTC). The EPA has issued a memorandum to the Regions announcing it intends to withdraw the Phase II Rule in its entirety as a result of the recent Court Decision (Decision) on Riverkeeper 2. The memo further indicates that EPA Regional Offices are to implement §316(b) on a Best Professional Judgment (BPJ) basis in NPDES permits until the Court Decision issues are resolved. At this time EPA is considering resolution options that include a re-hearing in the Second Circuit, appealing to the Supreme Court or making revisions to the Rule to address remanded portions of the Rule. It is likely to be several years before the Court Decision is resolved either through further litigation and/or further Rulemaking.

The goal of the projects discussed in this proposal are to support HECO in development of a cost effective compliance approach for Honolulu, Kahe and Waiau under BPJ and to ensure that HECO has the necessary information to comply with the federal Phase II Rule once the Decision issues are resolved.

EPRI proposes to complete this work in partnership with Alden Research Laboratory Inc. (Alden) and Tenera Environmental Inc (Tenera). EPRI, Alden and Tenera (Team) have previously provided §316(b) compliance support services to HECO. EPRI and Alden supported HECO in developing a compliance strategy for the Phase II Rule and the Proposal for Information Collection (PIC). Tenera has supported HECO in conducting the impingement and entrainment studies. Thus the Team is fully knowledgeable of the Honolulu, Kahe and Waiau facilities.

Statement of Work

As a result of the Decision, HECO has requested a proposal for two §316(b) projects. The first project is to support HECO in working with the Hawaiian Department of Health (DOH) on a cost effective BPJ approach and implementation of the approach. The second project will be to provide detailed cost estimates on the feasibility, cost and effectiveness of alternative fish protection technologies and operational measures.

Project 1 – Prepare BPJ §316(b) Compliance Documents

Honolulu, Kahe and Waiau all have language in their NPDES permits requiring that these facilities must comply with the Phase II Rule requirements that includes submittal of a

Comprehensive Demonstrations in early January of 2008. This project will be to support HECO in negotiating an alternative BPJ approach for compliance for the three facilities and implementation of the approach. This project will be completed in three Tasks.

Task 1 – Prepare BPJ Approach Description for Submittal to DOH

The recommended approach for HECO's three OTC facilities is to develop draft permit language to substitute for the current §316(b) compliance language and provide the rationale in support of the proposed language. The recommended approach for all three facilities would be based on making a determination of whether "adverse environmental impact" (AEI) is occurring. This determination would be based on an analysis of the one year impingement mortality and entrainment study data collected in 2006/2007 to evaluate whether or not the level of losses indicate there is a reasonable potential for population level impacts to the species impinged and entrained. If there is no significant risk of AEI, then the existing cooling water intake structure (CWIS) should be deemed Best Technology Available (BTA) for this permit cycle or until the Court Decision issues are resolved.

Tenera has reported that impingement and entrainment losses for all three facilities are relatively small. The approach will be based on preparation of estimates of equivalent adult losses for commercial and recreational species and production foregone for forage species as a means of putting entrainment and juvenile fish losses into perspective for the AEI determination. The analysis will also include using available recreational and commercial fishing harvests as a further means of putting losses into perspective.

Task 1 will be to prepare a description of the approach and draft permit language for submittal to DOH. The accompanying language in support of the approach would explain that based on the relatively small losses (subject to final confirmation by Tenera) there is low potential for significant AEI. The language will further explain that due to the costs and uncertainty associated with BTA, no immediate change in BTA is warranted (i.e. the existing CWIS is BTA). At this point when the Decision issues are resolved, BTA could range from a determination that the existing CWIS is BTA under the Cost-Benefit Test (if that part of the Decision were overturned on appeal) to a determination that a closed-cycle cooling retrofit is required. Due to the wide range of uncertainty for BTA and low potential risk of AEI based on sampling results, no interim action is warranted under BPJ. The draft of the approach will be provided to HECO for review and comment and revisions will be made to address comments prior to providing HECO with the final document for transmittal to DOH.

Task 2 – Complete AEI Summary for Review by HECO

The first year of sampling is now concluding and final sample processing is being completed. Once the first year data set for each facility is available data analysis will be initiated. Annual, seasonal (monthly) and diel estimates of impingement and entrainment by species and life stage will be generated. Based upon available life history data for dominant impingement and entrained species and BPJ, estimates of equivalent adult

(commercial and recreational species) and production foregone (forage species) estimates will be generated. These estimates will then be discussed in terms of potential significance to the affected populations or to local commercial and recreational fisheries. The results of the analysis will be discussed with HECO staff prior to preparation of the draft §316(b) document for each facility.

Task 3 – Complete AEI §316(b) Demonstration Study

This Task will consist of preparation of a report for each facility on the results of the AEI analysis. A draft report will be provided to HECO for review and comment and a final report will be provided to HECO that addresses the comments.

Project 2 – Prepare Detailed Fish Protection Technology and Operational Measures Analysis.

HECO previously had Alden perform a preliminary assessment of alternative fish protection technologies as part of it's §316(b) strategic compliance planning process. At that time use of restoration measures under Compliance Alternative 3 and/or use of the Cost/Benefit Test under Compliance Alternative 5 were identified as the most cost effective compliance alternatives. Unfortunately as a result of the Decision both these options were deemed unlawful. The chances of a reversal by the Second Circuit (i.e. assuming EPA were to ask for a re-hearing) are extremely small. Hunton & Williams indicates this almost never happens. If EPA appeals to the Supreme Court and the Court agrees to hear the case and overturns the Decision, detailed technology evaluations would be required by the current Rule no matter which compliance alternatives or options are required short of installing closed-cycle cooling. If EPA addresses remanded portions of the Rule, the Rule will be based on "best performing" technologies in the performance standard range. A detailed technology evaluation would serve several purposes that include:

- providing HECO with an updated detailed analysis of feasible compliance technologies and operational measures and their costs based on full quantity takeoff cost estimates and drawings of how such technologies might be deployed. This will provide HECO with an estimate of its financial exposure if the Court Decision remains unchanged.
- identification of any information gaps that would require additional information collection to confirm the feasibility, cost or performance of the technologies identified.
- demonstrating to DOH that HECO is proactively moving forward, recognizing that §316(b) compliance will be re-visited once the Court Decision has been resolved through further litigation and/or rulemaking.

Detailed Evaluation of Alternatives

The detailed evaluation would expand on the potential options identified in the appraisal-level assessment. This will include a more detailed assessment of feasibility for each of

the options previously developed as well as additional technologies that have potential applicability. This project will be completed in two Tasks.

Task 1 – Facility Information Update and Review

In reviewing Alden's existing information for Honolulu, Kahe and Waiau, Alden identified additional information needed for these facilities to complete the detailed alternatives analysis. A list of the needed information is provided in Attachment A of this proposal. The first Task will be acquisition and review of the additional information necessary for the analysis.

Task 2 – Detailed Fish Protection Alternatives Analysis

Detailed designs of each technology or operational change based on site-specific factors would be completed. Design drawings of each technology that holds potential to meet the performance standards will be created. In cases where technologies or operational changes are already being used, but which alone can not meet the performance standards, other technologies that could further reduce impingement mortality and entrainment (IM&E) to meet the standards will be evaluated. Estimates of direct costs will be developed for each technology evaluated in this task, as well as cost for operation and maintenance (O&M). These cost estimates will be based on quantity take-offs for the conceptual designs of each alternative and historic cost data developed for other power facilities. The costs developed in this task will be sufficient for use in a Comprehensive Cost Evaluation Study in the event that HECO wishes to conduct a Cost-Cost Test. Estimates of biological effectiveness will be developed for each alternative based on currently available data and information. These estimates of effectiveness will focus on Representative Species (RS) and lifestages based upon the recently collected impingement and entrainment data and can be used as input to models used to estimate the benefits associated with each alternative. The report will also discuss any significant uncertainties regarding the feasibility or performance of each technology. Additionally, the report will identify the expected "best performing" technology as specified in the Decision.

All three stations will be required to meet the IM & E reduction standards. HECO is currently conducting biological sampling at each station. These data will be assessed relative to changes in species composition and abundance that may impact the selection of technologies. The efforts required for each facility are discussed below and a list of required information is provided as an attachment (Attachment A).

Waiau

In the preliminary evaluation, Alden identified seven technology or operational change options for meeting the performance standard:

- Coarse-mesh modified traveling screens
- Fine-mesh modified traveling screens

- Wide-slot wedgewire screens
- Narrow-slot wedgewire screens
- Barrier net
- Reduced pump flow
- Closed-cycle cooling

Alden will reassess most of the technologies identified in the preliminary evaluation for Waiau and provide greater detail on each option. Additional options will be considered based on the most current information available. At HECO's request, Alden will not investigate cooling towers further.

Kahe

As with Waiau, Alden will reassess most of the technologies identified in the preliminary evaluation for Kahe and provide greater detail on each option. Other options whose status has changed will be considered based on the most current information available. In the preliminary assessment, Alden identified seven technology or operational change options for meeting the performance standard:

- Coarse-mesh modified traveling screens
- Fine-mesh modified traveling screens
- Wide-slot wedgewire screens
- Narrow-slot wedgewire screens
- Barrier net
- Reduced flow
- Closed-cycle cooling

No further evaluation of closed-cycle cooling will be performed at this time.

Honolulu

The level of effort required for Honolulu will be similar to that described above. In the preliminary assessment, Alden identified six technology or operational change options for meeting the performance standard:

- Coarse-mesh modified traveling screens
- Fine-mesh modified traveling screens
- Wide-slot wedgewire screens
- Narrow-slot wedgewire screens
- Reduced pump flow
- Closed-cycle cooling

Meetings:

At the request of HECO we have budgeted the cost of a meeting to support HECO in discussing the results of the AEI submittal to the Board.

As an optional task an estimate is also provided for a one day meeting in Honolulu to discuss the results of the technology alternatives analysis. The purpose of this meeting is to provide a presentation of findings to HECO facility and environmental staff on the feasibility and cost of the technologies being evaluated either prior to or after submittal (based on HECO's preference) of the draft report. For costing purposes, we have assumed Dave Bailey (project manager) and one Alden engineer will attend the meeting and one day of preparation will be required for each meeting.

Project Deliverables

The following deliverables will be provided to HECO based on these projects.

1. A draft and final letter discussing the §316(b) BPJ approach and rationale and proposed permit language to substitute for the current §316(b) language.
2. Data summary of impingement and entrainment sampling results for Honolulu, Kahe and Waiau and AEI evaluation based on those results.
3. A draft and final report for Honolulu, Kahe and Waiau presenting the results of the BPJ AEI analysis.
4. A draft and final report will be prepared for Honolulu, Kahe and Waiau presenting the results of the fish protection technologies and operational measures analysis. The report for each facility will provide cost and performance estimates for technologies and identify the likely "best performing" technology.
5. A power point presentation for use in presenting the results of the AEI study to DOH.

Optional Task – Should HECO elect to fund the optional task the PowerPoint presentation will be made available to HECO.

Personnel:

The Project Manager assigned for this work is Mr. David E. Bailey, Sr. Project Manager for EPRI. Dr. John Steinbeck of Tenera will serve as the principle fisheries biologist who will conduct the AEI analysis. Alden staff assigned to perform the technology alternatives analysis includes Messrs. Thomas Cook, Nathaniel Olken, and Ray Tuttle.

Price:

The price for Project 1 and Project 2 as described in this proposal is $190,000.

The price for the optional meeting is $13,500.

Terms and Conditions:

This work will be performed under EPRI's standard terms and conditions for Tailored Collaboration projects.

Schedule:

The following schedule is proposed for the project:

Activity	Schedule
Project 1	
Submittal of Draft BPJ Letter to HECO	Within 2 Weeks of Contract Award
Final BPJ Letter to HECO	Within 1 Week of Receipt of Comments
Submittal of AEI Assessments	August 15, 2007
Submittal of Draft AEI Assessment Report	October 15, 2007
Submittal of Final AEI Assessment Report	November 15, 2007 (Assumes comments provided by November 30, 2007)
Project 2	
Information Acquisition and Review Completion	Within 6 Weeks of Contract Award
Submittal of Draft Technologies Assessment	October 1, 2007
Submittal of Final Technologies Assessment	November 21, 2007 (Assumes comments received by October 21, 2007)
Meetings	
Presentation to DOH	3 weeks notice of meeting data for travel arrangements requested
Optional Technology Assessment Presentations	3 weeks notice of meeting data for travel arrangements requested

WORK AUTHORIZATION NO. 01

Under Consultant Services Master Agreement MSTR-IP-06-007
Contract No. PJW-07-012, Portion 01, Element 01

CWA Section 316(b) Support Services

I. Request for Quote

Under the terms and conditions of the General Services Master Agreement, dated July 20, 2006 by and between EPRI SOLUTIONS, INC ("Contractor") and Hawaiian Electric Company, Inc ("Company"), Company hereby requests a proposal from Consultant to perform the following Work:

Provide consultant services to
1) Prepare Best Professional Judgment CWA Section 316(b) Compliance Documents.
2) Prepare Detailed Fish Protection Technology and Operations Measures Analysis.

Date 07/03/07

Kirk Tomita (Company)

II. Contractor's Proposal

Contractor hereby proposes to perform the Work described above in Section I, under said terms and conditions, for a total not-to-exceed cost of **$88,200.** The balance of the project ($101,800) will be funded with Tailored Collaboration and Deposit Account dollars. Work will begin no later than July 20, 2007 and be completed on or before December 30, 2007.

Mr. David Bailey will act as Contractor's Designated Representative during the performance of this Work.

Date April 20, 2007

EPRI Solutions proposal received on 04/20/07
David Bailey (Consultant)

III. Work Authorization

Contractor's foregoing Proposal is accepted. Contractor is authorized to perform the Work as proposed. Company's Designated Representative for this Work Authorization shall be Kirk Tomita.

Date 7/03/07

DTF

Sherri Ann Loo,
Manager, Environmental Department

INVOICE

Invoice:	EP00319866
Invoice Date	July 3, 2007
Page:	1 of 1

Please Remit To:
EPRI-DEPT #1527
PO Box 61000
San Francisco CA 94161
United States

Customer No:	11156
Payment Terms:	Net 30
Due Date:	August 2, 2007
Customer Ref:	

AMOUNT DUE: **88,200.00 USD**

Customer: Hawaiian Electric Co., Inc.
Accounts Pavable
PO BOX 2750
Honolulu HI 96840-0001
United States

For billing questions, please call: 650-855-2669 Original

Line	Description	Quantity	UOM	Net Amount
1	66063-TC HECO 316b BPJ Honolulu, Kahe and Waiau Generating Stations	1.00	EA	50,900.00
2	66063-TC Match HECO 316b BPJ Honolulu, Kahe and Waiau Generating Stations	1.00	EA	50,900.00
3	Tailored Collaboration Pool for funding year 2007 for EPRI 501c3.	1.00	EA	(50,900.00)
4	66063-CF HECO 316b BPJ Honolulu, Kahe and Waiau Generating Stations	1.00	EA	88,200.00
5	Deposit Account for General Use	1.00	EA	(50,900.00)

Subtotal:	88,200.00
AMOUNT DUE:	**88,200.00 USD**

Please wire funds to:
Bank of America, New York, NY
ABA# 026009593
Acct. No.: 1233954313
SWIFT Address: BOFAUS3N

Tax I.D. # 23-7175375
EPRI is a non-profit United States Corporation.
Please include an invoice copy with your remittance.

Approved for payment
By
Environmental Dept.
Date 7/03/07

HAWAIIAN ELECTRIC COMPANY INC.
2007 RATE CASE
Environmental 316(b) Cost
(In Thous)

	2007										Normalized
	Jan-Apr[1]	May[1]	Jun	Jul	Aug	Sept	Oct	Nov	Dec	TOTAL	Over 3 Yrs
316(b) incurred 1/07-4/07[2]	$311									$311	$104
Monitoring- Tenera Est		$27	$51	$52						$130	$43
Extended Monitoring- Tenera		$38	$50	$50	$50	$50	$50	$50	$51	$389	$130
Closed Cycle Cool Eval- EPRI					$6					$6	$2
Best Prof Judge Eval- EPRI[3]				$88			$14			$102	$34

(1) Actuals
(2) Please refer to June 2007 Update, HECO T-6, Attachment 3 for Expense Element breakdown
(3) Note:BPJ estimate of $214k in Attachment 5 was an error that was corrected to $204k in Attachment 17 of this response. HECO O&M will cover half of the project costs ($102k) and EPRI matching dollars will be used for the balance ($102k)
Note: All 2007 activities have firm commitments to spend. Refer to June 2007 Update, HECO T-6, Attachment 5.

	2008													Normalized
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL	Over 3 Yrs
Continue IM&E Eval*	$48	$49	$48	$49	$48	$49	$48	$49	$48	$49	$49	$49	$583	$194
Analyze/Eval 2nd Yr data					$35	$35							$70	$23
Comments to EPA	$15												$15	$5

*Firm commitments from January to April, 2008. Refer to June 2007 Update, HECO T-6, Attachment 5.

	2009													Normalized
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL	Over 3 Yrs
Continue IM&E Eval	$48	$49	$48	$49	$48	$49	$48	$49	$48	$49	$49	$49	$583	$194
Analyze/Eval 2nd Yr data					$35	$35							$70	$23
Research Fish Prot Tech					$30	$30							$60	$20
Pilot Tests Select Tech								$500					$500	$167
Research Life History Fish and Invert					$35	$35							$70	$23
Comments to EPA on proposed rule	$20												$20	$7

All costs (except for Jan-Apr 2007) fall into expense element 508, consultant services.

CA-IR-423
DOCKET NO. 2006-0386
ATTACHMENT 22
PAGE 1 OF 1

HAWAIIAN ELECTRIC COMPANY INC.
2007 RATE CASE
Costs Incurred for 316(b) Work for the period May 2007-June 2007

		Waiau HP002592	Kahe HP002593	Honolulu HP002594	Totals
May 2007 (Charges to O&M expense - NE Indicator).					
	150	$232	$306	$537	$1,075
	155	$25	$29	($42)	$12
Overheads		$142	$187	$406	$735
	501	$19,211	$19,211	$19,793	$58,216
		$19,609	$19,734	$20,695	$60,038
June 2007 (Charges to O&M expense - NE Indicator).					
	150	$276	$327	$385	$988
	155	($2)	($8)	($46)	($57)
Overheads		$163	$190	$256	$609
	501	$42,717	$42,717	$43,423	$128,857
	900	$1,127	$1,171	$1,127	$3,425
		$44,280	$44,397	$45,145	$133,822

HAWAIIAN ELECTRIC COMPANY INC.
2007 RATE CASE
Costs Incurred for 316(b) Work for the period May - June 2007
under workorder number HP002592 (Waiau PP - 316(b))

RA / Exp Element	May 2007	June 2007	Totals
JW - Water & Hazardous Materials Division (Environmental Dept.)			
Labor -150	$232	$251	$483
Labor True-up - 155	$25	($2)	$22
Overheads	$142	$148	$290
Outside Services - 501	$19,211	$42,717	$61,928
Fin. Stmt Item -900		$1,127	$1,127
	$19,609	$44,240	$63,850
JA - Administrative Division (Environmental Dept.)			
Labor -150		$26	$26
Labor True-up - 155		($0)	($0)
Overheads		$15	$15
	$0	$40	$40
Totals			
Labor -150	$232	$276	$508
Labor True-up - 155	$25	($2)	$22
Overheads	$142	$163	$304
Outside Services - 501	$19,211	$42,717	$61,928
Fin. Stmt Item -900	$0	$1,127	$1,127
	$19,609	$44,280	$63,890

Note: Totals may not add exactly due to rounding.

HAWAIIAN ELECTRIC COMPANY INC.
2007 RATE CASE
Costs Incurred for 316(b) Work for the period May - June 2007
under workorder number HP002593 (Kahe PP - 316(b))

RA / Exp Element	May 2007	June 2007	Totals
JW - Water & Hazardous Materials Division (Environmental Dept.)			
Labor -150	$306	$269	$576
Labor True-up - 155	$29	($6)	$23
Overheads	$187	$156	$343
Outside Services - 501	$19,211	$42,717	$61,928
Fin. Stmt Item -900		$1,171	$1,171
	$19,734	$44,307	$64,040
JA - Administrative Division (Environmental Dept.)			
Labor -150		$57	$57
Labor True-up - 155		($1)	($1)
Overheads		$34	$34
	$0	$90	$90
Totals			
Labor -150	$306	$327	$633
Labor True-up - 155	$29	($8)	$22
Overheads	$187	$190	$377
Outside Services - 501	$19,211	$42,717	$61,928
Fin. Stmt Item -900	$0	$1,171	$1,171
	$19,734	$44,397	$64,131

Note: Totals may not add exactly due to rounding.

HAWAIIAN ELECTRIC COMPANY INC.
2007 RATE CASE
Costs Incurred for 316(b) Work for the period May - June 2007
under workorder number HP002594 (Honolulu PP - 316(b))

RA / Exp Element	May 2007	June 2007	Totals
JW - Water & Hazardous Materials Division (Environmental Dept.)			
Labor -150	$232	$251	$483
Labor True-up - 155	($18)	($30)	($48)
Overheads	$175	$166	$341
Outside Services - 501	$19,793	$43,423	$63,217
Fin. Stmt Item -900		$1,127	$1,127
	$20,182	$44,937	$65,119
JA - Administrative Division (Environmental Dept.)			
Labor -150	$304	$135	$439
Labor True-up - 155	($24)	($16)	($40)
Overheads	$232	$90	$321
	$512	$208	$720
Totals			
Labor -150	$537	$385	$922
Labor True-up - 155	($42)	($46)	($88)
Overheads	$406	$256	$662
Outside Services - 501	$19,793	$43,423	$63,217
Fin. Stmt Item -900	$0	$1,127	$1,127
	$20,695	$45,145	$65,839

Note: Totals may not add exactly due to rounding.